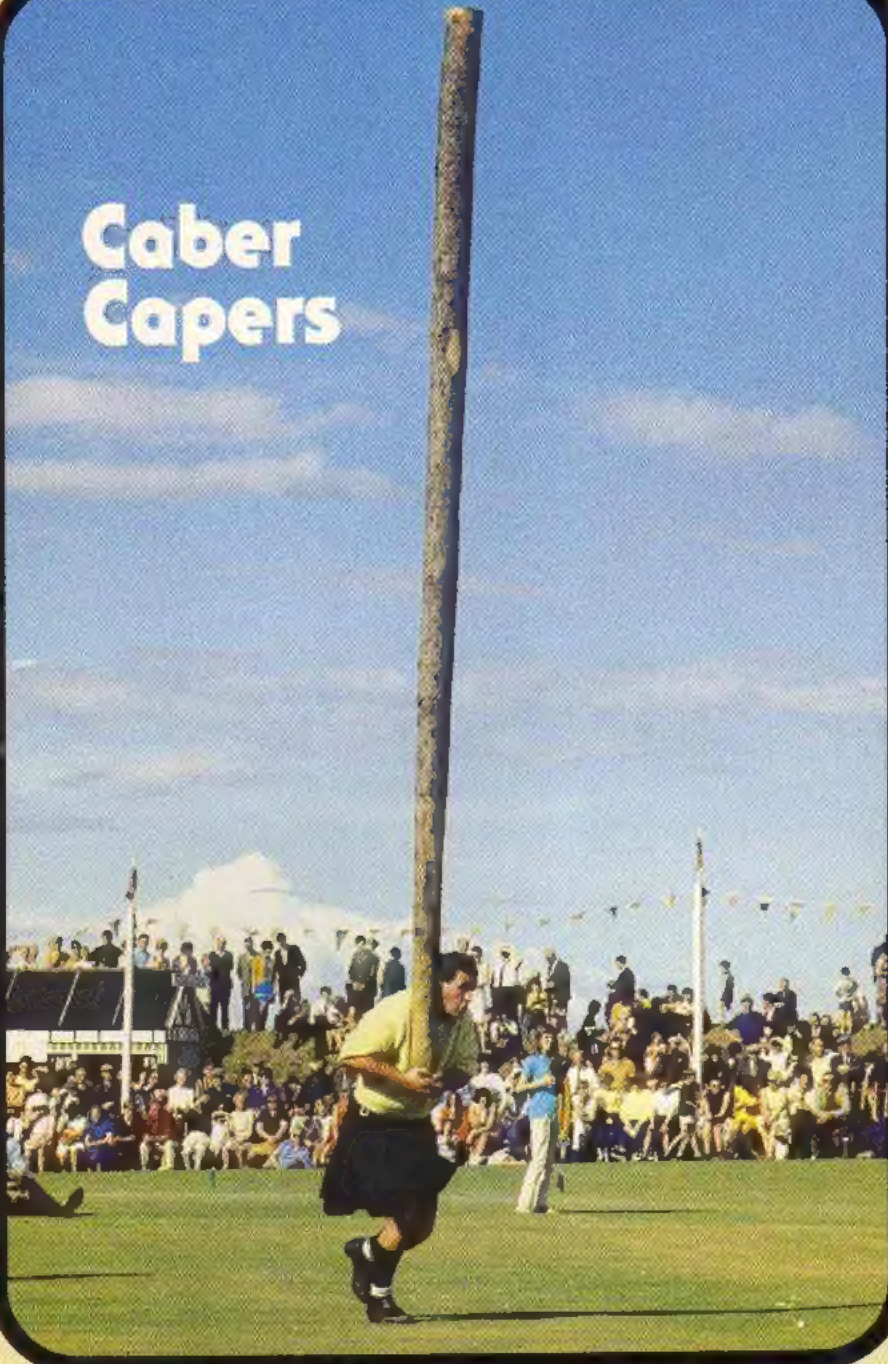


321 CONTACT



**Jump Into
This Sports
Issue!**

Caber Capers



You've heard of tossing a coin. But how about tossing a caber? People play this weird tree-tossing sport in Scotland. You can read more about it in the "List of the Month." It's just one part of this month's look at sports.

If you want a closer look at games people play, watch sports week on our TV show. Check your local listings to find out when "3-2-1 CONTACT" is on in your area. Meanwhile, for more on strange sports, turn to page 22.

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Front Cover: Carol Lewis hopes that her powerful long jump will win her an Olympic gold medal this summer. See page 9 for more about Carol.



The Sporting Life

YOUNG ATHLETES ON THE MOVE

by Nora Zamichow

What does it take to be a famous athlete? To find out, 3-2-1 CONTACT interviewed five young athletes. Although each is outstanding in a different sport, these young men and women have much in common.

Each has made many sacrifices to reach the top. All have put in long, tiring hours of training. They have had to give up spending time with family and friends. And each athlete has also suffered from bruises, pulled muscles, or broken bones. It's all part of being a champ.

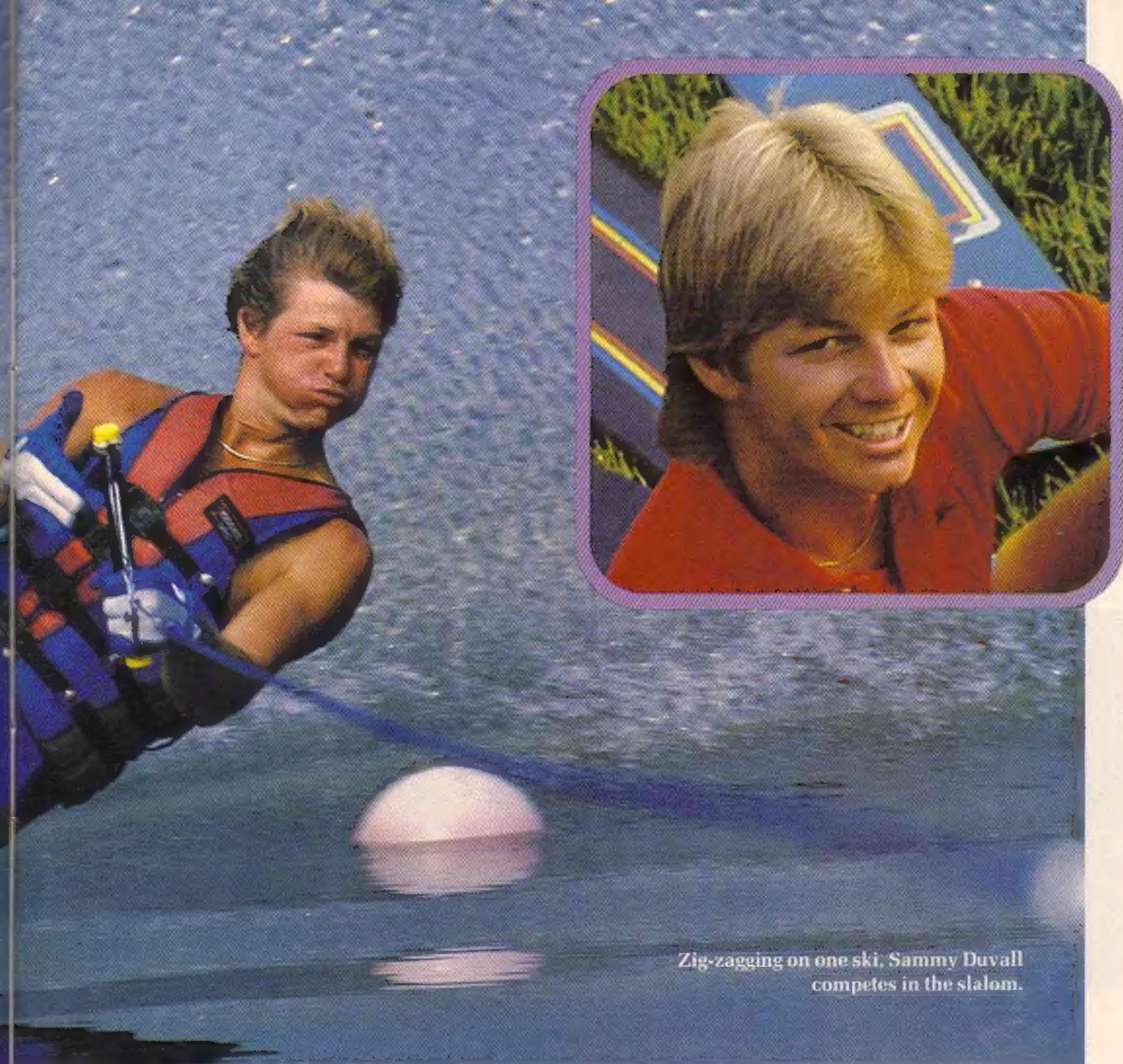
You may have seen these sports stars on our TV show, "3-2-1 CONTACT." And you may see some of them again—at this year's Olympic Games.

Water Wizard Sammy Duvall

When Sammy Duvall water-skis, he doesn't always stay in the water. Sometimes he gets propelled into the air—as high as a three-story building.

Sammy starts his airborne stunt by skiing behind a boat that pulls him along at 40 miles (64 km) per hour. The boat tows him up a ramp. At the top, Sammy becomes airborne for a few moments. "It's like floating," Sammy exclaims. "I've done it many times, but it's still thrilling."

Sammy's jumps are long as well as high. His greatest was 196.5 feet (60 m)—a U.S. record.



Zig-zagging on one ski, Sammy Duvall competes in the slalom.

When Sammy competes, he enters several events. One is the slalom. Sammy stands on one ski and zigzags around buoys floating in the water. If he doesn't fall or miss a buoy, he returns for another try. This time, his rope to the boat is shortened to make the course harder. The shorter the rope, the farther he must lean over to get around the buoys. Sammy can lean over so far that one shoulder touches the water.

In the trick event, Sammy does stunts on his skis. He performs one trick that no other water-skier can do. As a boat pulls him along, Sammy flips into a somersault in the air, while still wearing his skis. Fans gasp as Sammy lands

back in the water—safe and sound.

Today, the 21-year-old spends about an hour a day practicing jumps, tricks, and slalom. And since water-skiers need strong muscles in their legs and lower back, Sammy works out with weights three days a week.

All that work and dedication have paid off. Not only does Sammy Duvall leave his fans breathless, but he has won two world championships.

"Now I want to stay the best," he says. "I want to be number one for the next five years." With Sammy's jumps and tricky back flips, he just might do it! ➤

Skating With Angela Zuckerman

Angela Zuckerman, 18, is a blur as you watch her skate on the ice. She's one of the fastest speed skaters in the U.S. Angela zooms along at 30 miles (48 km) per hour.

When Angela races across the ice, the air that pushes against her body slows her down. This is called *wind resistance*. She must position herself in a way that gives the least resistance to the wind. So Angela bends over, making her upper body parallel to the ice.

Crouching also lets Angela increase the length of her stroke. That's the distance her skate travels with one push. The longer her stroke, the faster she will cross the ice.

Sometimes Angela clasps her hands behind her back. That helps reduce her wind resistance.

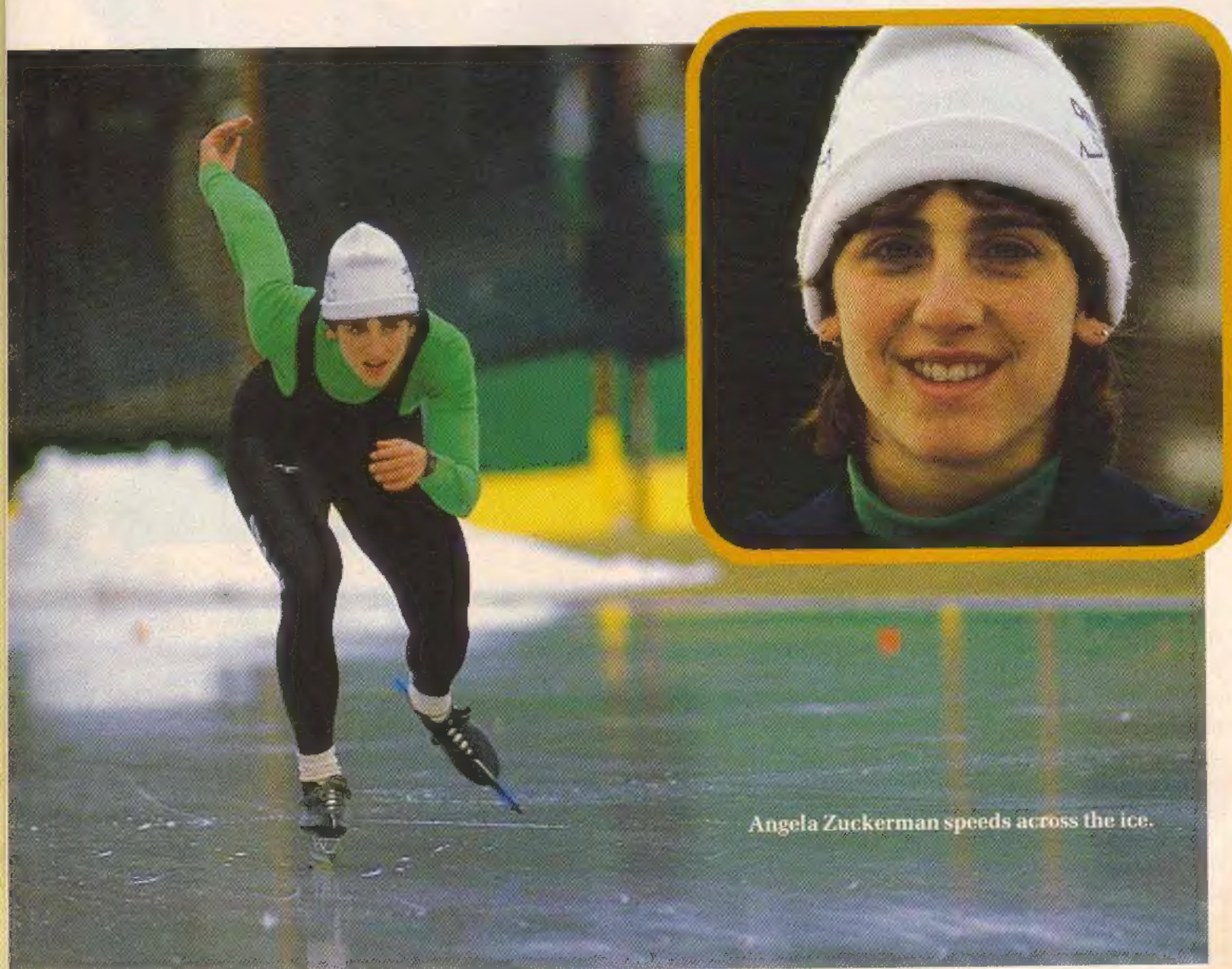
Other times she swings her arms. One arm swings behind her back while the other crosses her chest. The motion pushes her forward.

Angela began speed skating when she was 14. At first she trained one or two hours a day. Now she trains up to four hours a day.

Not all of Angela's training occurs on the ice. Like other athletes, she must be in overall good shape. So Angela runs, bikes, lifts weights, and does exercises to make her legs strong.

Training and competing is hard and sometimes frustrating. "We train, eat, and sleep," says Angela. "You're so worn out that it's hard to do anything else."

Sometimes Angela thinks about quitting. But after giving so much of her time to skating, she knows she wants to stick with it and head for



Angela Zuckerman speeds across the ice.

Diane Durham performs
on the four-inch-wide
balance beam.



the Olympics.

"When you dedicate yourself to a sport, it has to come first," Angela notes. And the other young athletes here would have to agree.

Flipping Over Diane Durham

Diane Durham began taking gymnastics lessons when she was only four. At 15, she is the best female gymnast in the United States. "Success is winning, working hard and getting good results," she told 3-2-1 CONTACT.

Getting those results hasn't come easy for Diane. When she was 12, she even quit gymnastics. Diane was tired of training 16 to 20 hours a week. She wanted a life like other kids her age. But soon she changed her mind. "Gymnastics was all I'd ever done, and I finally realized that

I liked it," she explains.

When you watch Diane, you can tell she doesn't just like her sport, she loves it. On the uneven bars, she seems to fly from the high bar to the low one and back again. You might think Diane would zip right off the top bar. But she does a graceful handstand instead.

"My favorite event is vaulting," Diane says. It's a little like leapfrogging. To vault, you spring over an object by placing your hands on it and pushing yourself over. The object is called a horse vault. To reach it, Diane first leaps on a springboard. From there, she places her hands on the vault and pushes herself over.

At meets and championships, Diane's fans are easy to spot. They wear T-shirts that say, "I love Diane." It's easy to understand why. ➡

Vauling With Billy Olsen

In first grade, Billy Olsen sat down with the "P" volume of an encyclopedia. He reached the page with pictures of pole vaulting and stopped in amazement. It looked like a terrific sport.

Billy was 15 when he finally learned how to pole vault. In two years, he had won every competition in Texas.

Today, Billy is one of the best pole vaulters in the world. He set seven world records for indoor pole vaulting. Billy also holds the U.S. record for outdoor vaulting.

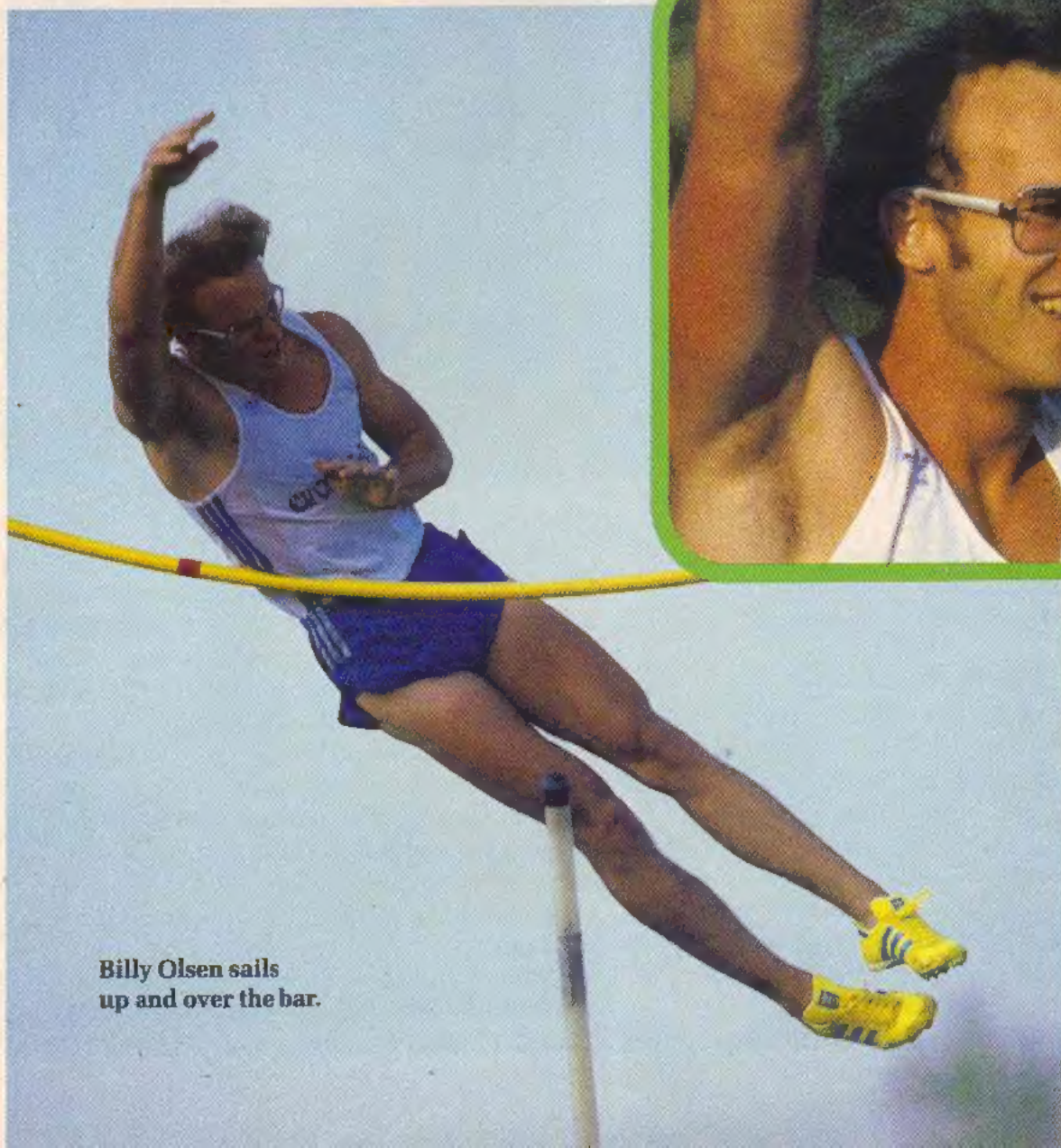
Billy uses a long fiberglass pole to spring high in the air. When he competes, he takes an approach run to gain speed before his takeoff. He says, "You build as much speed as possible while staying under control."

Billy runs at least 40 yards (36.6 m) down a

track. Facing him is a bar set at a measured height. As he nears the bar, he carries his pole parallel to the ground. Right before reaching the bar, he shoves one end of the pole into a wedge-shaped box. With one end planted, the pole bends under Billy's weight. When it springs back, Billy pushes himself upward—feet first. As he goes up, he turns his body. This lets him go over the bar and land on his back on a soft, padded air mattress.

If Billy hits the bar and it falls, the vault doesn't count. Billy says, "When the bar is high, you have little room for error. If one tiny thing is wrong, you'll miss."

Even after setting world records, Billy still has to train. He works out seven days a week for up to six hours a day. Since speed and strong legs are important in pole vaulting, Billy runs



Billy Olsen sails up and over the bar.



Carol Lewis
springs into the air
for the long jump.



almost every day. He also lifts weights and does gymnastics.

Although some athletes quit after setting world records, Billy is still going strong. "I want to see how high I can go," he said. "Like every athlete, I want to win an Olympic gold medal."

Jumping With Carol Lewis

If you ever see Carol Lewis do a long jump, you may think she's flying. That's because she travels such a long distance before her feet touch ground. In fact, Carol set a U.S. women's record by jumping 21 feet, 6.5 inches (6.5 m).

Like all athletes, Carol, 18, works hard to be the best. Since long jumping requires strong leg muscles and upper body control, Carol runs and

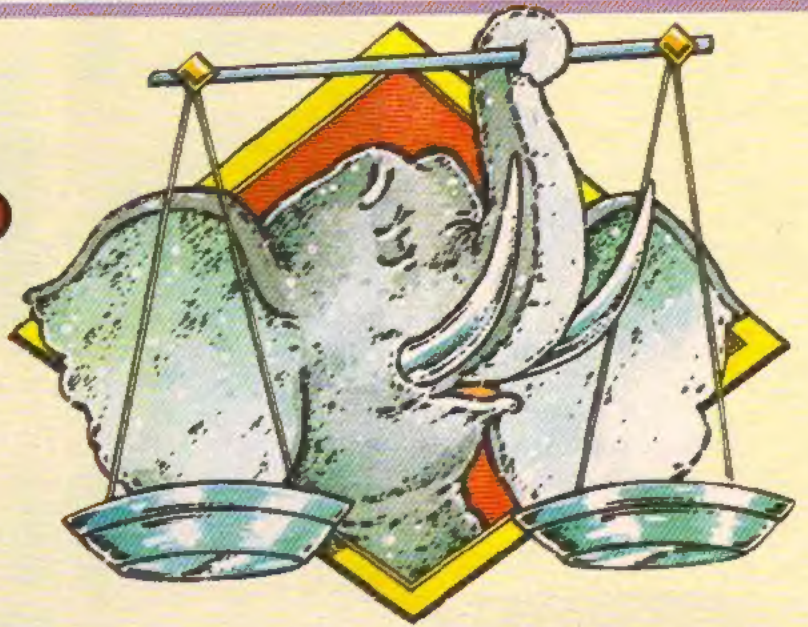
lifts weights six days a week. She practices jumping only once a week. She says, "Once you've learned the technique, you don't lose it—you perfect it."

How does Carol do her incredible long jumps? First she gets a good start by building up speed. So Carol runs down a track before she jumps.

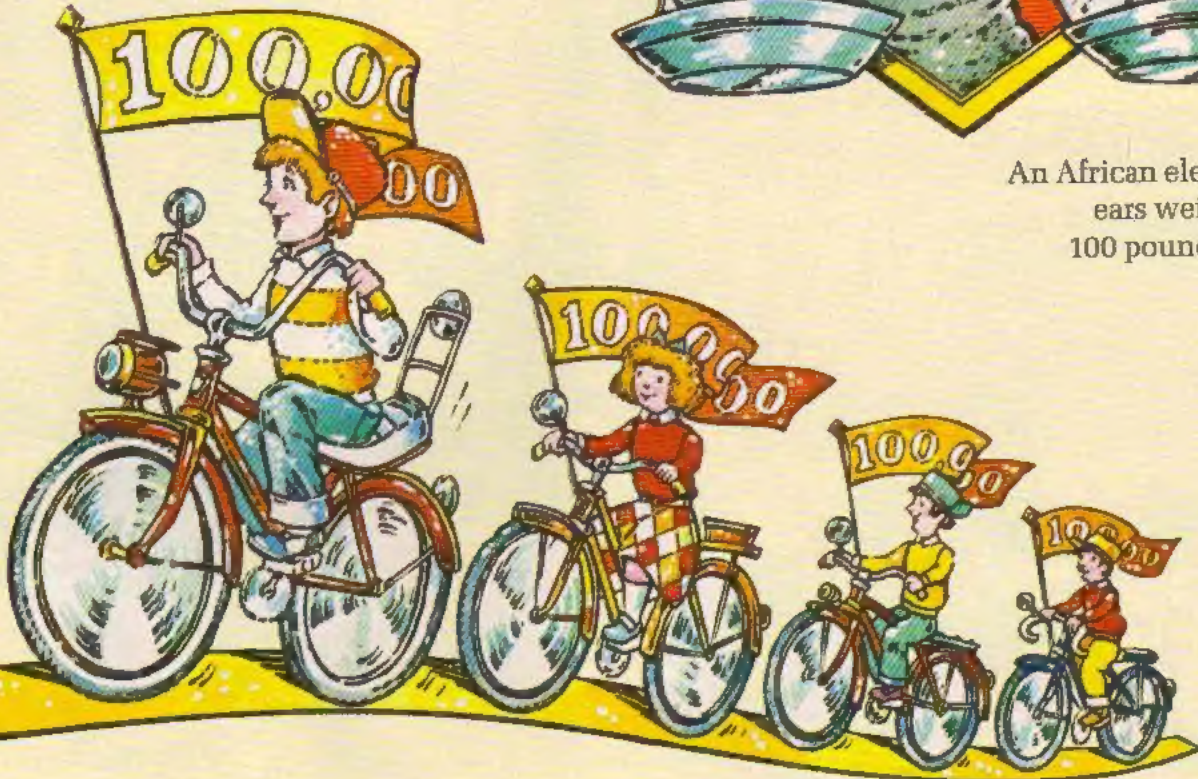
In the last two steps before her jump, she shortens her stride to get more spring for her lift-off. She also bends her knees to lower her body. When Carol takes off, her legs look as though they're running in the air, helping her go farther.

What are Carol's hopes for the future? "I want to be the greatest woman long jumper," says the Olympic hopeful. Coaches and fans agree that Carol's dream may just come true.

Factoids



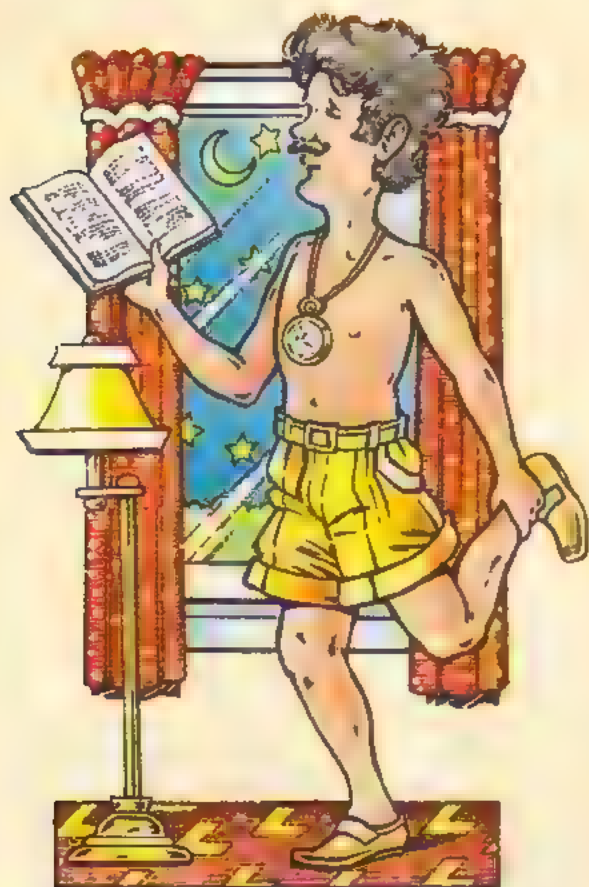
An African elephant's ears weigh over 100 pounds each.



There are more than 100 million bicycles in the United States.



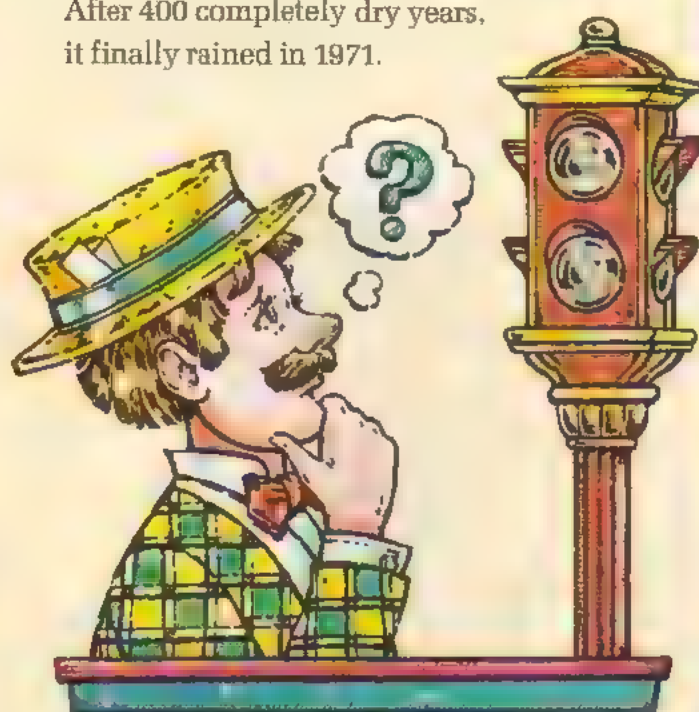
To keep from drifting, sea otters sometimes wrap themselves in long seaweed that grows from the ocean floor.



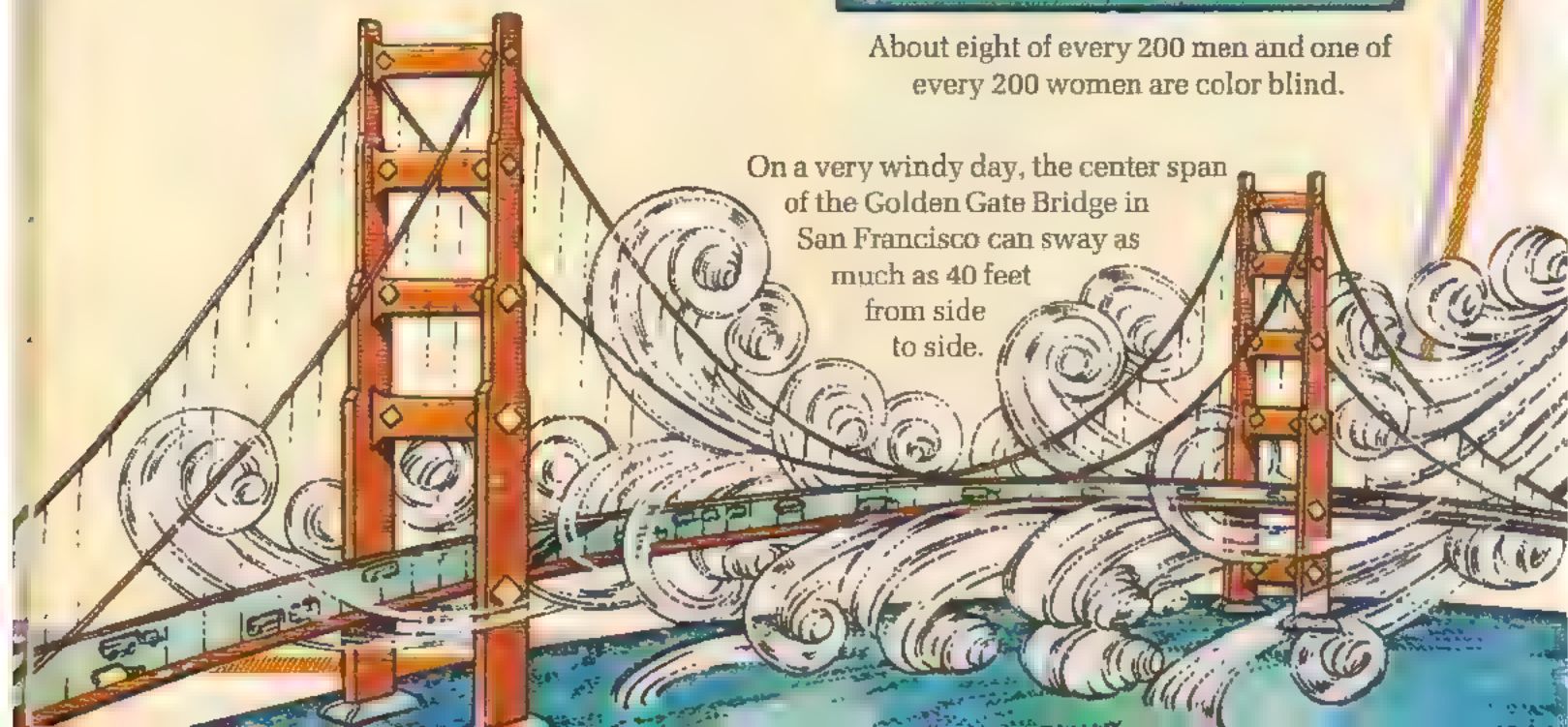
The record for balancing on one foot was set in 1980 by V.S. Kumar Anadan. He stood on one foot for 33 hours.



The longest drought on record occurred in the Atacama Desert in Chile. After 400 completely dry years, it finally rained in 1971.



About eight of every 200 men and one of every 200 women are color blind.



On a very windy day, the center span of the Golden Gate Bridge in San Francisco can sway as much as 40 feet from side to side.

Any Questions?

by Anita Malnig

What are clouds made of?

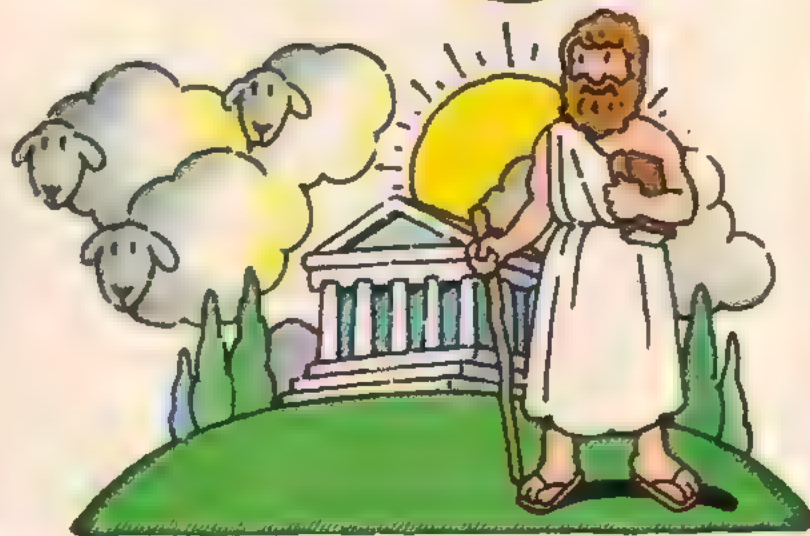
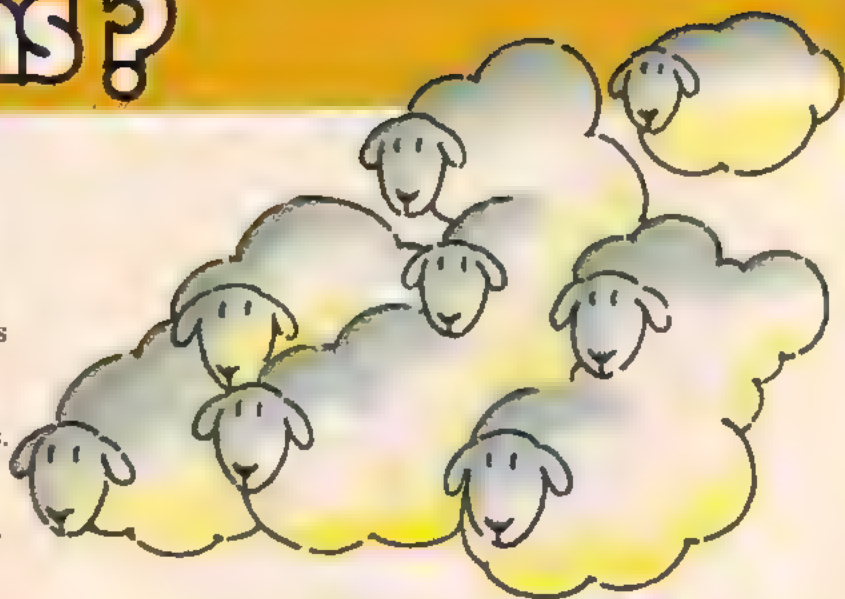
Thousands of years ago in Greece, people thought that clouds were the sheep of the gods. The Greeks were far from the truth, of course.

Clouds are actually a form of water. The water comes from oceans, lakes, rivers and damp forests. When the sun heats the water, it evaporates. It rises into the air as water vapor. When the temperature is low enough, the rising water vapor turns back into water. It condenses. If it's really cold, the vapor turns into ice crystals.

But in order to condense, the water vapor first has to attach itself to tiny bits of solid particles in the air—like dust. Once the water vapor has something to hang on to, it can condense into water or ice. Those drops of water and ice become the clouds you see in the sky.

When the clouds get even cooler, the ice crystals grow. Soon they are heavy enough to fall closer to earth, where they become rain. Then the whole cycle starts again.

Question sent in by Karen Bierly, Columbus, OH.



Why do apples turn brown when they're cut?

When you cut an apple, the air hits it right away. As you probably know, the air contains a gas called oxygen. What you may not know is that the apple has a certain chemical coloring, or pigment. When the oxygen and pigment mix, a chemical reaction takes place. This process, called oxidation, turns the fruit brown.

One good way to keep your fruit from turning brown is to cover it. Then the air won't get to it. A trick many cooks know about is to sprinkle lemon juice on apple slices to keep them white. The juice contains vitamin C. The vitamin prevents oxygen from combining with other elements. Since the oxygen can't mix with the apple, the fruit doesn't turn brown. By the way, even if your apple does turn brown, don't worry. It may look a little gross, but it's still okay to eat.

Question sent in by Tami Felton, Cincinnati, OH.



Do you have a question that no one seems able to answer? Why not ask us? Send your question, along with your name, address, and age, to:

Any Questions?
3-2-1 CONTACT
P.O. Box 599
Ridgefield, NJ 07857

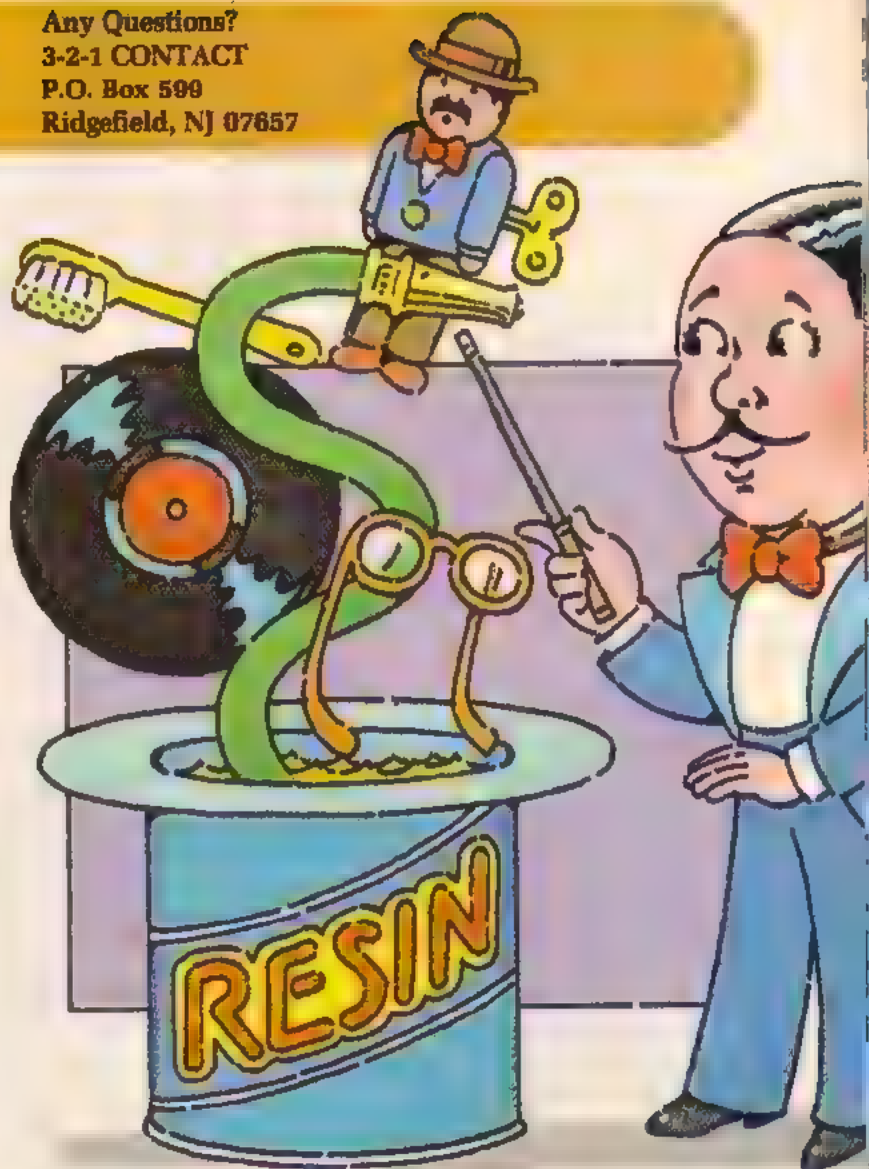
How are plastics made? Think about it. Plastics come in an incredible variety of shapes and textures. Trash bags, record albums, even eyeglass lenses, are all plastic. Even though these objects look and feel different, they have one thing in common. They all start out from substances found in the earth.

One of these substances is petroleum, or oil. Manufacturers put the petroleum through a process that makes a soft material called synthetic resin. This resin can also be made from coal or limestone.

At the factory, the resin is heated. That's the basic step for making all plastics. Then, depending on the kind of plastic to be made, the steps vary.

Sometimes resin goes into molds. When the plastic hardens, out pop objects such as toys and toothbrushes. Another method forces heated resin through tubes. Garden hoses, for example, are made this way. When the resin is put between huge rollers, thin plastic squeezes out. It may become trash bags or kitchen wrap. The plastic possibilities are endless!

Question sent in by Niko Hobson.



Why does eating something cold give you a headache?

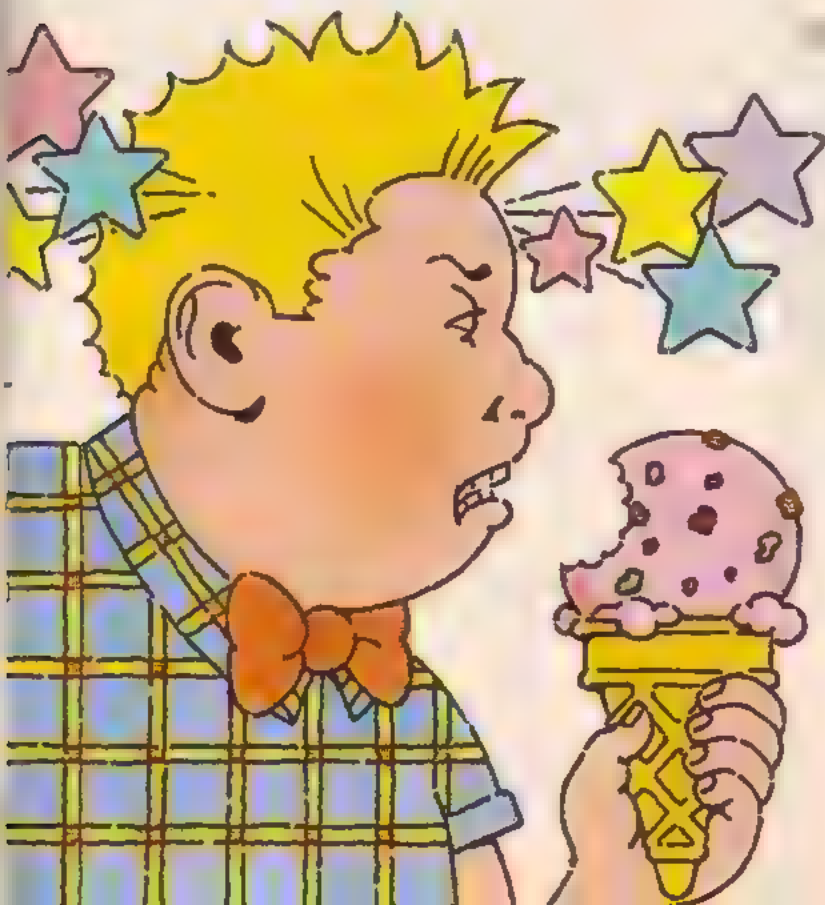
It's a hot day. To cool off, you eat a few spoonfuls of ice cream, and ouch—a headache!

The reason for the pain in your head has to do with blood vessels. Blood travels from your heart to all parts of your body in tubes called arteries.

Let's say you eat or drink something very cold. The coldness hits the arteries that line your throat and lead to your brain. The arteries squeeze together. Then they quickly swell up. The nerves that control the movement of the arteries are stretched by all this action. The stretching hurts the nerves, which send pain signals to your brain.

Eventually, the headache goes away. To make the pain leave faster, place your whole tongue against the top of your mouth. Your tongue will warm the area, and the pain will be gone.

Question sent in by Mike Munden, Raton, NM.



FASTER, FARTHER, HIGHER

by David
Sullivan

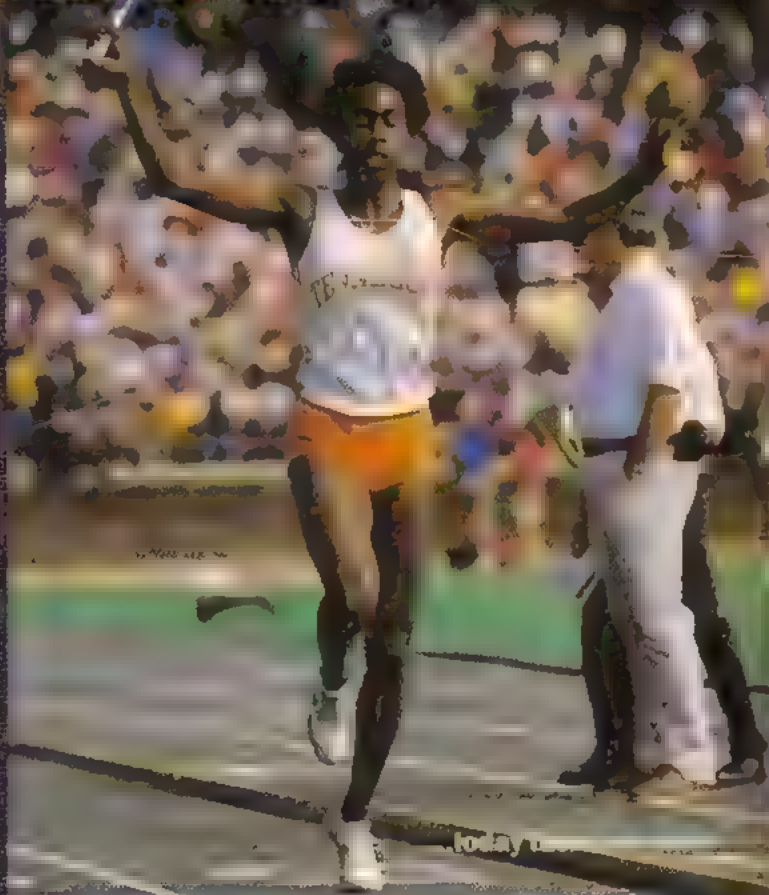


Once there was only
one four-minute miler.

For 100 years, the four-minute mile seemed to be a sports record that could never be broken. Then in 1954, runner Roger Bannister made history. He became the first person to run a mile in less than four minutes. Since then, the four-minute mile has been broken by many people—including high school students.

New records are now being set in other sports as well. Athletes are swimming faster and jumping farther than ever before. They're also play-

WHY ATHLETES ARE GETTING BETTER & BETTER



ing better tennis and lifting heavier weights.

Why are people getting so much better at sports? A new way to study the body, called sports science, has a lot to do with it. Researchers are finding exciting new ways to help people get the most out of their training. Playing equipment is improving in many sports, too.

No one knows for sure if athletes will go on getting better and better forever. Maybe there are some limits to how fast a person can run or swim. However, those limits haven't been reached yet. In fact, sports scientists are making predictions about records that will be set in the future. So read on. Someday, you might grow up to be one of the new record breakers!

Trying New Training

"Science can take a lot of the trial and error out of training," says Phil Rosenthal. He works at the Institute for Sports Medicine in New York City. Scientists like Phil are using computers to help the U.S. Olympic team. They are helping athletes find the best ways to train for sports such as the long jump and the discus throw.

Exactly how do you tell how an athlete moves when playing a sport? Scientists film athletes who are performing at their best. Then a computer scans each frame of film and draws a stick figure cartoon.

A motion such as lifting a weight is broken down into small parts. To pinpoint just how a person's muscles, joints, and limbs all work together, colored arrows appear on the computer's viewing screen. They show the direction

and force of the athlete's lift. This also tells the scientist how athletes should change their moves to use their powers to the fullest.

Athletes then use this information to train better. American swimmers practiced a new way of springing into the pool. This fast start improved their time. Shot putter Terry Albritton learned to throw without bending his front knee. He set a new world's record. And World Cup winner Debbie Brill's new training added three inches to her high jump.

Tools of the Trade

Sports science is helping to produce better equipment for athletes, too. In 1940, Cornelius "Dutch" Warmerdam was the first to pole vault 15 feet. He used a bamboo pole, just as all pole vaulters did at that time. People thought that no one could go any higher. Sure enough, his record held until 1955.

Today's pole vaulters are setting much higher records, however. Modern fiberglass poles make the difference. They bend and snap back like a diving board, adding another four feet to Dutch's old record.

New equipment gives a big hand to skiers, too. Shorter and lighter fiberglass skis make it easier to leap and turn during races. Clothing can even be an important part of a skier's equipment. Today's slick, skintight plastic ski ➡

Scientists are helping weightlifters...



...pump more iron than ever.





suits cut down on wind resistance and save important seconds in a race.

How to Eat for Success

To set new records, athletes need strength and energy. Some believe they can improve their performance by eating a lot of red meat and taking plenty of vitamin pills. Most scientists don't agree, though.

"If it is not wheat germ, then it is vitamin C. And if not that, it is protein pills," says Dr. Philip Weisser, mentioning just a few recent athletes' food fads. Dr. Weisser believes that a well-balanced diet is all that a performer needs. He is a marathon runner himself. He says food fads come and go, but improvements in world's records continue at a steady pace.

Sports scientists also warn against using

drugs. You may have heard that some athletes take steroids. These chemicals do build muscles. But because they also have dangerous side effects, steroids are banned in every sport.

Yet some athletes break rules and take drugs because they want to win so badly. When they get caught, they must give back their medals and their records are crossed off the books.

What's Next?

Is the sky the limit for athletes of the future? With better training and equipment, will people go on setting new records forever?

"I don't know if it's possible for anyone to run a mile in under three minutes," says Phil Rosenthal. "The body has certain limits. How much work can the heart do? How much oxygen can move to the muscles?"

Dr. Gideon Ariel, an advisor to the U.S. Olympic team, agrees. He believes there are some limits to what athletes can do. But the limits he predicts are way beyond today's best records.

To find out what could be the best possible discus throw, he used a computer to study the 12 best Americans. "In the best throws, we find a pattern," he says. "It is like using a fishing rod or snapping a towel." All the forces in the athlete's body come together in the best way at just the right moment.

If discus throwers used the pattern perfectly, what distance could they throw? According to Dr. Ariel's computer, 250 feet. That is a big improvement over the current record of 233 feet, 5 inches!

Then Dr. Ariel went even further with the computer. What if an athlete could combine the strengths of two or more sports, he asked. "It's like taking the running speed of the fastest sprinter and allowing a long jumper to have that kind of speed," he explains.

Here are some new records he believes you might see in the future.

- ★ 8 feet, 11 inches in the high jump (present record is 7 feet, 8¾ inches)
- ★ 30 feet in the long jump (now 29 feet, 2½ inches)
- ★ 9.6 seconds in the 100-meter dash (now 9.95 seconds)
- ★ 85 feet in the shot put (now 72 feet, 8 inches)

Phil Rosenthal believes that over the next 20 years, America's athletes will continue to set new records. But finally, athletes will reach the limits of the human body. They may not be able to go any faster, farther, or higher.

But don't tell that to champions like pole vaulter Billy Olsen. Right after setting his world indoor record, he was already planning for the future. "I'm going to go higher," he said. If the human body has limits to what it can do, this young athlete does not want to hear about them!



...but fiberglass helps skiers go faster.



Contact Report

Flyaway Is it a bird? Is it a plane? No, it's a visitor at the Las Vegas Flyaway. That's where you can live out what may be one of your oldest dreams—to spread your arms and fly.

The way Flyaway works is really quite simple. It is an indoor space chamber which looks like a grain silo from the outside. Inside there is a 22-foot-high (6 m) circular padded room. Below a grate in the floor is a large airplane engine and propeller. It produces 130-mile-an-hour (209 km) winds.

The fliers receive 30 minutes of flight instruction. They put on baggy suits designed to catch the air currents. Then they spread out their arms Superman style, and soar, dive, loop, and glide for five minutes.

The idea for Flyaway came from California but it was developed in Canada by a man named Jean St. Germain. He built the first Flyaway in his backyard to amuse his children.

—Written by Quinith Janssen

Story suggested by Jason Trunzo,
Salt Lake City, UT.



In this special chamber, people fly through the air.

Slosh to Sleep? Jill enjoys her water bed. Why is that news? Because Jill is a leopard. At the San Diego Zoo, leopards, jaguars, hyenas, and spider monkeys all sleep on water beds.

Their water beds are different from ones you might use. They are made of aluminum, so the animals' claws won't poke holes.

These beds aren't for fun. They help keep the animals warm. Zoo critters used to sleep on concrete floors, warmed by heat lamps. But one bed does the work of four lamps, and it uses less energy. The zoo saves \$700 with each bed it uses.

Dr. John Phillips of the San Diego Zoo invented the water beds. The first was for curly-tailed lizards. In the wild, these animals absorb heat from rocks. They didn't enjoy the zoo's concrete floors which got too cold when cleaners hosed them down.

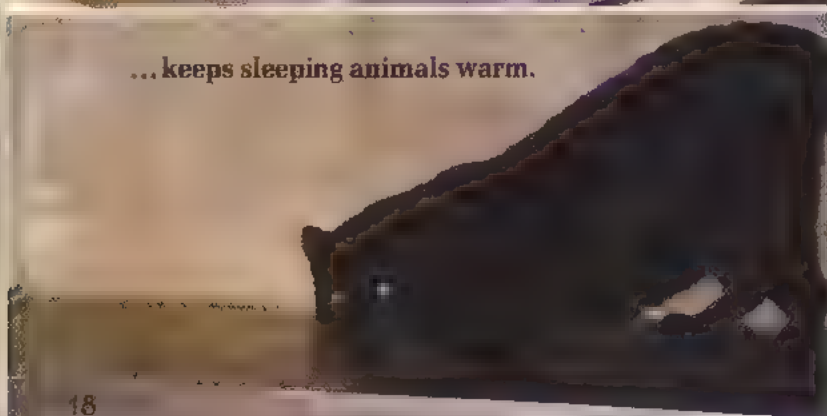
Now Dr. Phillips is working on a heated water perch. Furry koalas will cling to this tree trunk look-alike. Next? A water bed for kangaroos!

—Written by Alijandra Mogilner



A new kind of water bed ...

... keeps sleeping animals warm.



Contact Report

Skip Your Chores? Like many kids, Lewis Barton and Curtis Lawson wanted to skip their chores around home. The boys had to keep the car clean for their mother who travels around New Hampshire for her work. "She has to eat while she's traveling," says Curtis. "She was always spilling stuff and we'd have to clean the car."

So Lewis, 10, and Curtis, 14, invented a spill-proof car tray. The cup holder rocks with the motion of the car so the cup can't turn over.

When they got tired of cleaning the family pool, the kids invented a pool skimmer. Now Curtis and Lewis have these inventions registered with the government patent office. And that's not all. Other people want to buy their trays and skimmers, too. In this case, inventing a way to skip chores really paid off.

—Written by Michele Lyons

Story suggested by Charisse Callieham, Amy Connolly, Elizabeth Engalls, Myra Flores, Melissa Jones, Heather Parego, Carrie Reed, Crissie Seippel, and Toby Snyder.



Inventors Curtis and Lewis with their pool skimmer.

It Pays to Advertise You might think a spider would want its web to be invisible—right up until dinner gets trapped there. But some spiders actually weave special designs into their webs to make them easy to see.

People have wondered for years what these white zigzag designs are for. Now researchers at Cornell University have an answer. The silken designs are warnings. Birds see the white silk and fly around the web, avoiding a sticky crash that would destroy the spider's work. The web can remain all day to catch food.

Written by Mary Tota

What's That? Have you read about a kid who invented something new? Or one who set a new science record? Then cut out the story and send it to us. If we use it you'll get a CONTACT T-shirt. Include your name, address, T-shirt size, and the newspaper or magazine the story came from. Write to: **The CONTACT Report**

P.O. Box 599
Ridgefield, NJ 07657

Spider web
patterns

Record Breakers!

New sports records are being set all the time. For the six sports shown below, you'll see the earliest modern records. Then follow the high points along the way as brand new records are set—and broken again. The final line is left blank for you to fill in new records as they are set.



1983 19 ft., 1 in.

1963 16 ft., 5 in.

1912 13 ft., 2.25 in.

One Mile Run



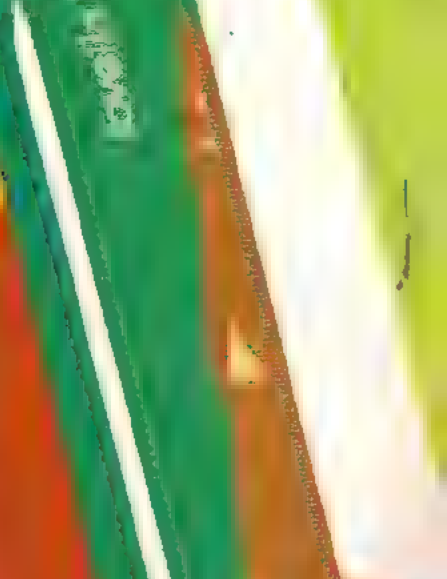
1981 3 min., 47.3 sec.

1954 3 min., 59.4 sec.

1913 4 min., 14.4 sec.



200 Yards





1983 327 ft., 2 in.

1953 263 ft 10 in

1912 204 ft., 5 in

1968 29 ft., 2 in.

1935 26 ft., 7 in.

1874 24 ft., 1 in.

1000 Yards

13.0 sec.

1981 2 hrs., 8 min., 42.2 sec.

1952 2 hrs., 20 min., 18.4 sec.

1908

1981 49.36 sec.

1975 50.59 sec.

1905 1 min., 5.8 sec.

100-Meter Freestyle Swim

(26.2 miles)

List of the Month Sports Shorts

by Gail Jarrow

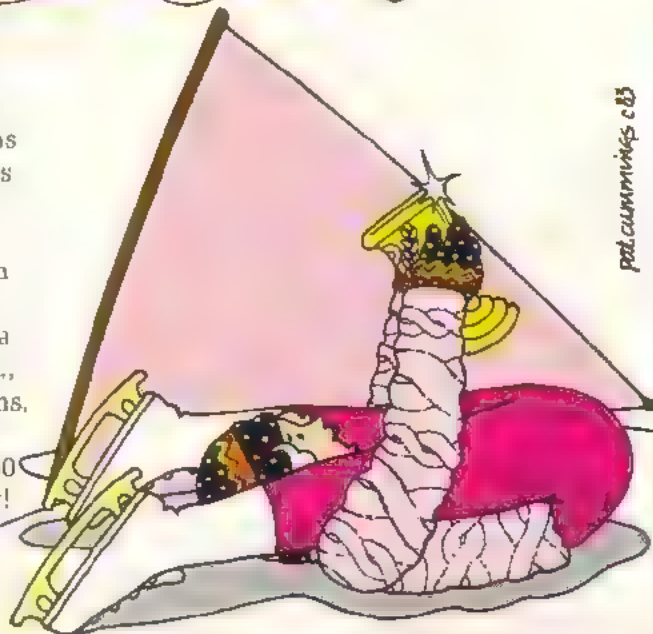
Ever hear about a sport where you toss tree trunks? Or a game where breathing is against the rules? Keep reading.



Logrolling Lumberjacks in North America hold contests to see who's best at riding a floating log. One person stands on each end of a log. Then they spin it with their feet. Each tries to make his opponent fall by changing the speed or direction of the spin. Usually one person falls after a few minutes. But logs have been rolled for three hours!

Skate Sailing This is ice skating with a sail. The wind blows against the sail, and the skater zooms across the ice, sometimes as fast as 60 miles (96.5 km) an hour.

Skate sailing started in Scandinavia during Viking times. Today it's a popular sport in the U.S., too. In some competitions, a prize is given for the funniest fall. Ouch! At 60 mph, that's not so funny!



pat.cummings c83

Codeball-On-Green

Invented by a Chicago doctor, William Code, in 1929, Codeball is played like golf. Except players kick the ball down a green into a bowl. Traps and hazards on the 14-hole course add to the challenge. And all the kicking strengthens leg muscles. Although Codeball was designed for out-of-shape adults, kids get a kick out of it, too!



Pancake Race Would you believe there's a race for pancake flippers? It's held every year in Olney, England, and in Liberal, Kansas. Racers run a course carrying a pancake in a skillet. They must flip the pancake three times during the race. The two towns compare results to pick the winner. It's some trick to run fast and flip a pancake without flopping.



Takraw Imagine a cross between soccer and basketball. That's takraw (TACK raw), a game played in Southeast Asia. Players shoot a ball through a hoop with feet, knees, elbows, or shoulders. No hands allowed! One of the hardest shots is kicking the ball with both feet together behind the back. Now that's fancy footwork!



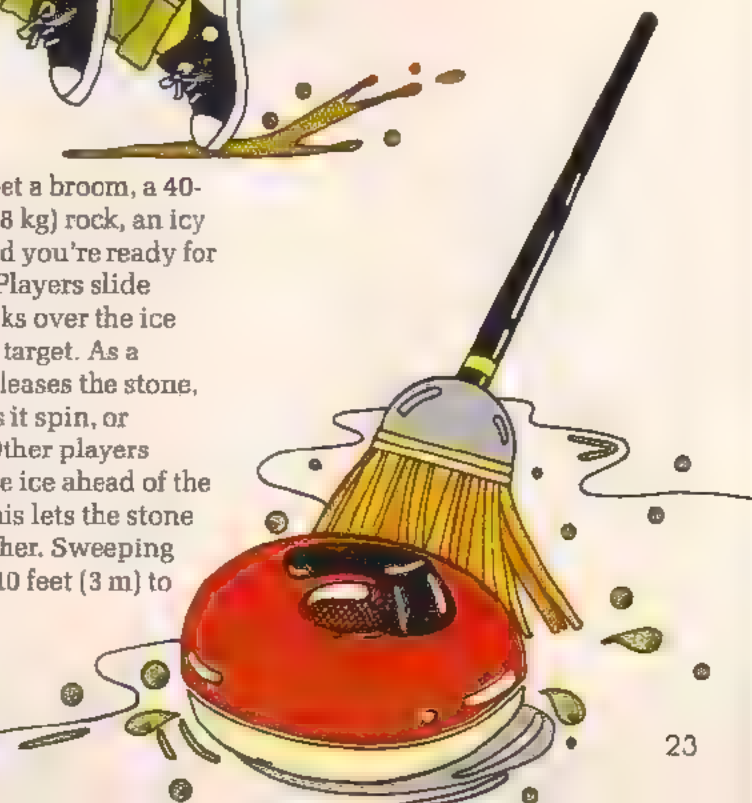
Tossing the Caber This Scottish sport requires amazing strength. A caber is a 120-pound (82 kg) log. Players hold the caber by one end, then toss it up. They must throw it with enough force to flip it over in the air. Contestants are judged on technique and distance. A caber has been thrown 40 feet (12 m). So if you're ever in Scotland, watch out for flying tree trunks!



Kabaddi Can you run fast and hold your breath a long time? Then try kabaddi (kuh-BODY), a sport from India. Players from two teams raid their opponents' side of the field. A raiding player must loudly call "Kabaddi" over and over. All opponents he tags are "out"—if he makes it back to his side before running out of breath.



Curling Get a broom, a 40-pound (18 kg) rock, an icy pond, and you're ready for curling. Players slide stone disks over the ice toward a target. As a player releases the stone, he makes it spin, or "curl." Other players sweep the ice ahead of the stone. This lets the stone slide farther. Sweeping can add 10 feet (3 m) to a slide!



New Ways To Win

by
Michele
Lyons

Modern
Sports
Equipment
Makes
a Hit

It's an important game for your team. It's the bottom of the ninth inning, two outs, and you're behind by one run. A runner is on third base. And you're at bat. You've got to get that runner home to tie the score.

What should you do? Go for a hit? Hope for a walk? Bunt? Well, don't go batty. Help may be on the way—from MARS.

In this case, MARS isn't the planet. It stands

for Mizuno Audio Receiver System. The heart of MARS is a helmet that is worn by every runner on base and the batter. The manager in the dugout has a small device that sends signals to the helmets. He pushes a button to signal a certain play. Microwaves carry the signal to the players' helmets. Then a computerized voice translates the signal and tells everyone what to do. The runners know what to expect and the players can coordinate their moves.

These helmets are still being tested by college and high school teams. But even if you never get



a message from MARS yourself, you may be using new types of sports equipment someday soon. Inventors are always coming up with new ideas for athletic gear.

Here's the inside story on some other sports inventions that are getting a workout right now. Do you think they'll be outstanding in the field?

Gloves That Are Catching On

Many people have dimples. Now baseball gloves can have them, too. One new glove has small round creases, called dimples, in the palm. You know how stiff a new glove can be before it's all broken in. The dimples make the glove soft and flexible right away. When a player closes his hand after making a catch, the glove forms a deep pocket.

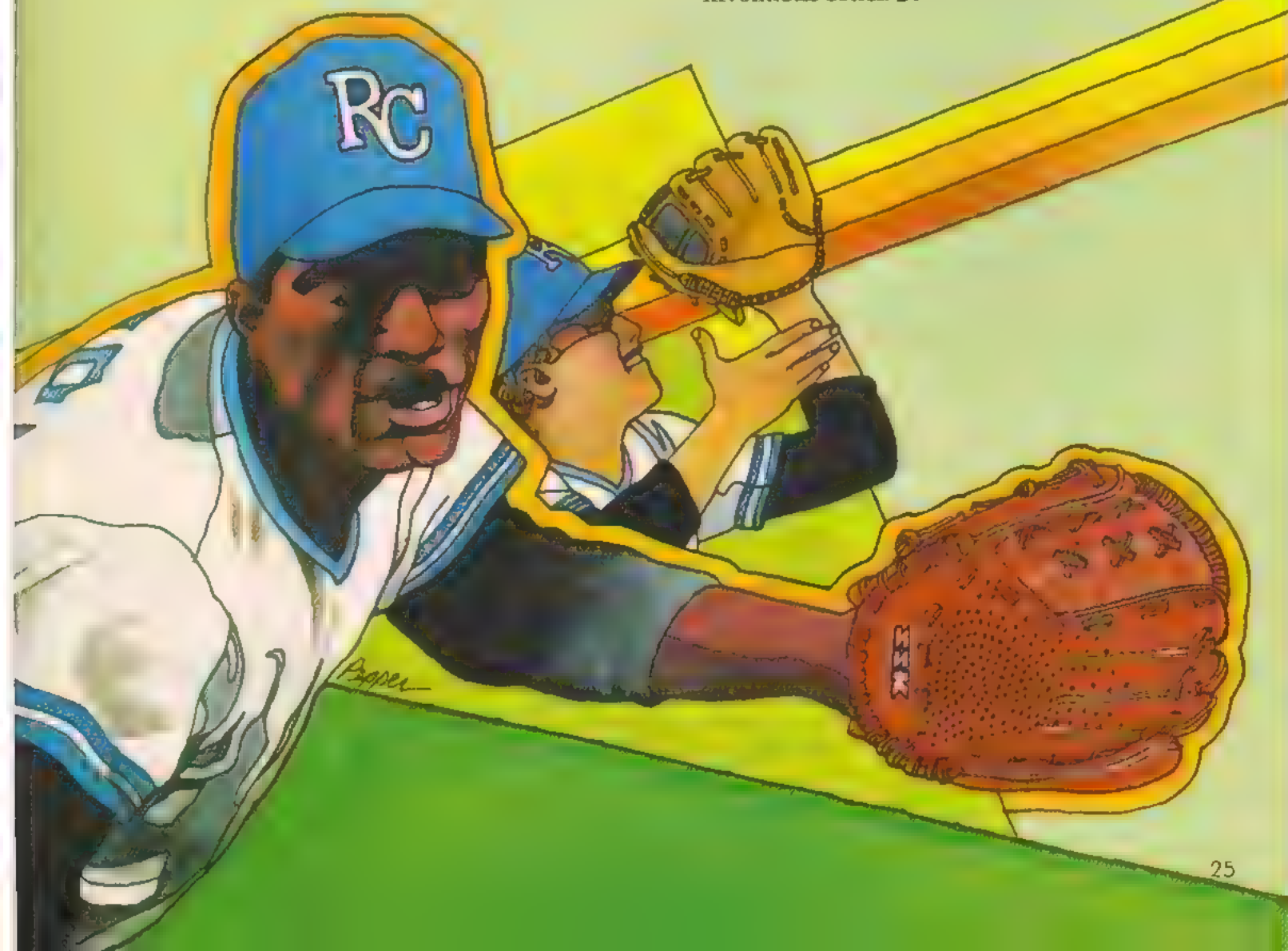
One dimpled-glove-user is Don Sutton of the Milwaukee Brewers. He says, "The dimpled

glove stops the ball from spinning out of my hand. I hope someday it will help me make a great play."

If you've ever flubbed a catch because the sun got in your eyes, you might try another new glove called an Opti-Web. The webbing of the glove is a tinted, see-through plastic. When a player holds his glove up to make a catch, the plastic part shields his eyes like built-in sunglasses.

John Shelby of the Baltimore Orioles tried out the new glove in spring training last year. He thinks it still needs some work. "You have to hold the glove right up to your face or you won't be able to catch a ball if the sun is shining in your eyes," Shelby says. "And then your fingers block your vision."

That points out one of the problems with any new invention. It takes time and changes in the design to get a new product just right. Athletes' comments and suggestions can help make sports inventions better. ➡



Tackling the Problem

If you've ever played football, you know how much a crunching tackle can hurt. When two players run smack into one another at full speed, it creates a powerful force. The force has to go somewhere. In this case, it goes directly into your body. Sometimes the impact can cause broken bones, black-and-blue marks, or other injuries. That's why you wear shoulder padding. The pads help absorb the force of tackles and hits before they reach your body.

No padding can protect against everything. But there are now shoulder pads that do a much better job. They are made of plastic and super-lightweight foam. The pieces are layered so it's easier for a player to move. Plus, the foam is packed tighter than ever before. So it absorbs much of the energy from blows to a player's body.

A stronger padding is also used in a new football helmet. Like other head gear, this helmet is lined with protective pads. But the new helmet comes with eight pieces of padding that snap in and out. Since everyone has a different sized and shaped head, it's a great idea. By choosing the right pads, everyone gets a custom fit.

Both the shoulder pads and the helmet were tested by college teams before they became available in stores. Today many professional players, like Tony Dorsett of the Dallas Cowboys, use these new pieces of equipment.



And for those of you who want to stay ahead of the game, there are even kid versions.

Running Into New Ideas

If running is your game, you know that your most important equipment is your legs. Not even the wackiest inventor has come up with a new type of leg. But inventors are designing equipment to help runners keep their legs and leg muscles in good running order.

Muscles stretch and contract when running. If they are cold and tight, they can be easily injured when an athlete starts to run. That's why athletes "warm up" before a race by performing bending and stretching exercises.

But warmed-up muscles can still cool down again before a race. That's where a new tight made of a material called Lycra comes in. It heats the sweat that comes from the body during

warm-up and keeps the heat near the legs. This helps keep the muscles from being injured.

When you get down to the bottom of things though, it's your feet that take a beating in running. But a new running shoe is cushioning the blow.

The shoe comes with separate pads. By changing the pads inside the shoe, runners can adjust for their weight and for different running surfaces. There's a super-soft red pad for running on hard surfaces. There's a gray pad for regular surfaces. And there's a hard blue pad for soft surfaces.

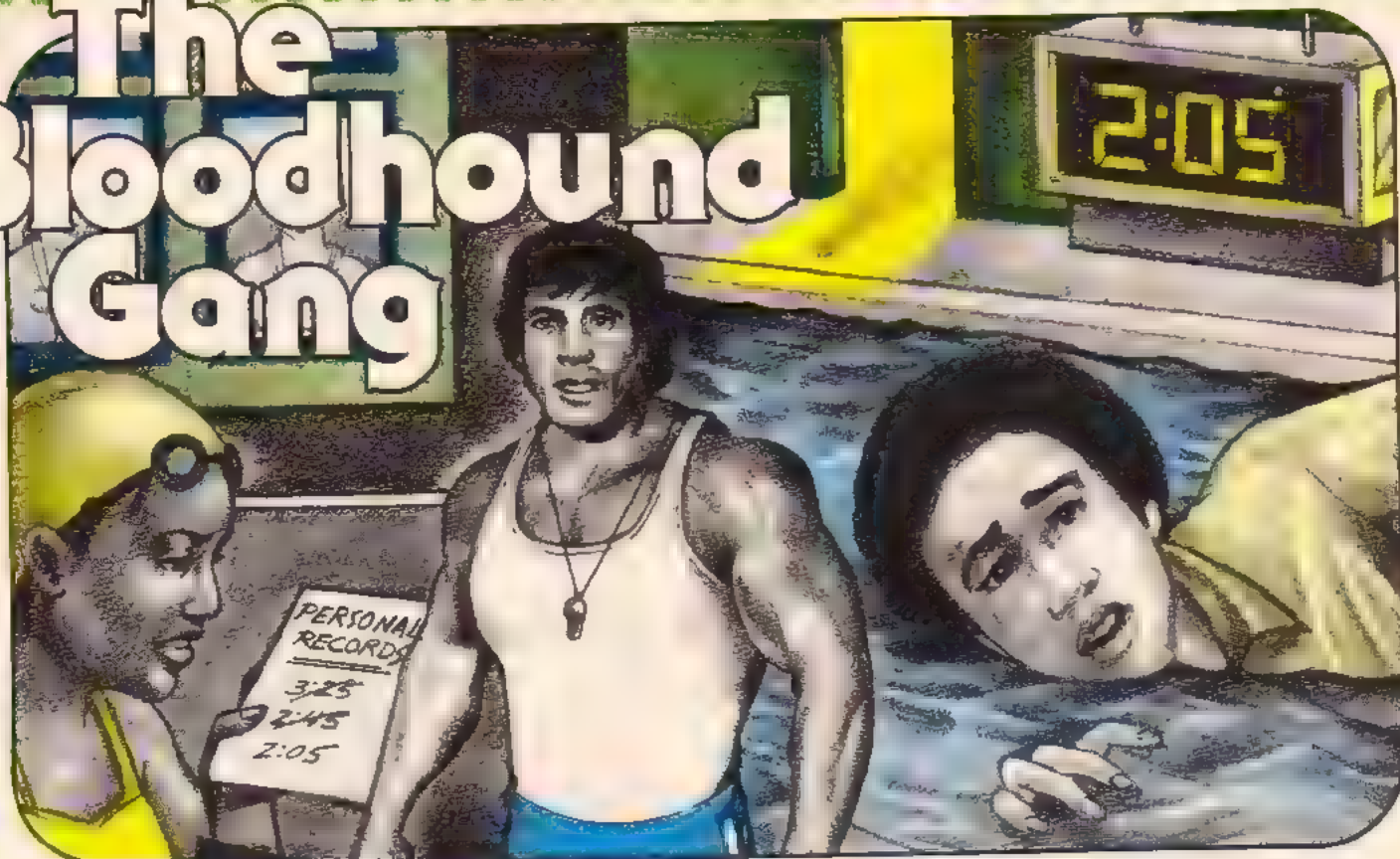
The running shoes are being worn by both professional and amateur athletes. And this summer, they will help keep many Olympic runners on their toes!

What's Up Next?

What kinds of sports equipment are in store for the future? Maybe shoes with springs that let players leap high in the air to catch a pass. Or how about a robot umpire that will call pitches and never make a mistake? These ideas may sound way out. But who knows? They may become the sports equipment of the future!



The Bloodhound Gang



The Case of the Swimming Scam

Part One

by Bill McCoy

Skip and Ricardo walked through the door of the Bloodhound Detective Agency, then stopped. "Wrong office," Ricardo said. "Looks like a library."

Vikki sat behind a huge pile of books. "Connie Diver lent them for my report on the Olympics," she explained. "She's picking them up today."

"Great Olympic Swimmers," Skip read a title. "Someone must have read this one a hundred times."

Vikki smiled. "Connie carried that book all last summer. Winning a gold medal is her dream."

The office door opened, and a girl walked in slowly, the way a zombie does in a monster movie.

Vikki's smile vanished. "Connie?" she said.

"Your hair is wet!" Skip said.

"I was in a swimming pool," Connie said, "trying out for the swim team."

"How did it go?" Vikki said.

"I blew it. Do me a favor and burn those

books." Connie pointed at the stack on the desk. "To think I daydreamed about the Olympics."

"Not everybody wins a gold medal," Vikki said.

"They don't make fools of themselves, either. I even spent my allowance for the last two months on special swimming exercises. At Hank Bodd's Special Swim Class, I swam 100 meters in a minute and a half. But when they clocked me at the team tryouts, I took two and a half minutes, as if I never took those exercises."

"Something's fishy here," Vikki said. "Let's look into this. Join this swimming course..."

"Not me," Ricardo said. "I don't swim."

"They said they needed somebody to do odd jobs around the gym," Connie said.

"Fine. Ricardo, you apply for the job. I'll sign up for classes," Vikki turned to Skip. "You're too young for heavy exercise classes, but here's what you can do. We need to find out more about exercise. And other people who took the course," she said. "You check that out."

Next afternoon, Vikki came to an old brick building with a brand-new sign. "Hank Bodd's Special Swim Class," it read. Ricardo stood sweeping the steps. He pretended not to know her.

Vikki joined a crowd of older teenagers and adults. A skinny, stooped-over man handed them forms to fill out. "It's \$12 for the first class. You get it back if you decide you don't want to go on with the course."

"Was that Hank Bodd?" one man whispered. "He doesn't look like a bodybuilder to me."

But when they had lined up in the gym, a man with muscles on top of his muscles came out. "Hi, folks," he said. "I'm Hank Bodd. Welcome to the wonderful world of exercise."

Swim School Without A Pool

Vikki looked around. "I thought this was a swimming class," she said. "Where's the pool?"

There was no water—just wooden tables all over the gym. Above them hung machines that looked like an inventor's nightmare. Old car parts, bicycle wheels and clock gears were joined to metal rods. "And what are those?"

"They're my special, patented Bodd-a-cisers," Hank said. "Built 'em myself. Tested them with young swimmers..." He pointed to pictures on the walls of people holding gold medals.

"That's Mark Spitz," one woman said.

"They will train you without a pool," Hank Bodd pulled rods down to each corner of a table. "I got the idea from the Nautilus system, where you work out against a machine. But the Bodd-a-ciser is much more. See, it teaches your muscles the best swimming methods, while you work out. Not only do you get stronger, you get faster and better. Now I need a volunteer."

Vikki came out of the crowd and got onto the table. Hank strapped her arms and legs to the metal rods. "Ready?" He turned the machine on. The rods began moving. So did Vikki's arms and legs—in slow swimming motions. "Your muscles and brain are learning the best motions for the Australian Crawl," Bodd said. "We call it patterning."

He went to a control panel by the machine. "Once you learn the right way, we teach your muscles to go faster and faster..." He hit buttons. The machine speeded up, and so did Vikki.

"Best of all, you don't even have to think about it. The machine does all the work." He stopped the machine, and let Vikki loose.

"You don't have to believe me," Hank Bodd said. "Just ask this graduating class of students." People came in, holding paper scrolls. "Even better, let them show you. Mike," he called.

The stooped-over man pushed in a big TV monitor.

"This is Mike Cogan, my assistant. He follows every workout with a videotape," Hank Bodd said. "Every Friday, we test you at a swimming pool. He tapes that, too. This is what the class looked like before they started the course." They watched scenes of class members swimming. Small numbers flashed in the corner of the screen. "We know exactly how well you do, because we time you with a computer clock at the pool," Bodd said.

"Now let's see the final exams." The screen showed the same students, but now they had shaved minutes off the times they took to swim the same distances. "Look at those numbers," Bodd said proudly. "The computer can't lie." He put his hands on his hips. "Now you know about the course. Anybody want to back out?"

"No way!" said the new students. "When do we start?"

Swim Time

For a week, Vikki went to Hank Bodd's. He would hook her up to a machine which moved her arms and legs in different swimming styles. By the time she finished, her muscles ached. "I just have to last until Friday," she whispered to herself. "Then I can time the tests on my own watch."

But when she came to the pool on Friday, Hank Bodd came over. "I see you're wearing a watch," he said. "We don't allow them."

"Why not?" Vikki asked.

"It could get lost in the pool," Bodd said. "Or ruined by the water. We don't want to be responsible. Besides," he pointed at the big digital clock on the wall, "we've got that to check the time. The computer never lies!"

Vikki swam 100 meters. Her record had been three minutes and five seconds. "Faster by 40 seconds!" Bodd yelled, pointing at the computer clock. It read 2.25. ➡

After the class, the Gang met to compare notes. "Nothing interesting for me to report," Ricardo said. "I sweep the gym and clean up the pool after the students on Fridays. And I empty a bucket that collects water from a leaky faucet. The only good part is that I don't have to come early to the pool. Bodd and his assistant fix things for the tests."

"There's lots for me to report," Skip said. "First off, none of the famous swimmers in Bodd's pictures know of him or his exercise machine."

"Now we know he's a phony," Vikki said.

"That's for sure," Skip said. "Knocking 40 seconds off your swimming record is impossible, according to the doctors I spoke with. Your body couldn't change that much in just a week."

"I couldn't tell if I swam any faster," Vikki said. "The trick must be in the computer clock."

"No problem. It could be programmed to give false information," Skip said. "We need some way to get the real times."

"Bodd and his assistant have a real thing about watches," Ricardo said. "The only reason they gave me the job was because I told them I didn't own one." He shook his head. "What we need is a way to time the class without a watch."

"A sundial—or an hourglass," Skip said.

"It's an indoor pool—no sunlight," Ricardo said. "And an hourglass is hard to hide." He snapped his fingers. "How about a water clock?"

"Sure!" Skip said. "People used them long ago. They would leak water at a steady rate. You could tell time by seeing how much water had run out."

"Do they have one at the pool?" Vikki asked.

"They do, but they don't know it," Ricardo said. "There's that leaky faucet dripping into the bucket. One of my jobs is to empty the bucket before it overflows. It's a very steady drip."

"So if you empty the bucket before I start swimming, and take it away when I'm done, we can figure out my time by how much water is collected." Vikki smiled. "And no one will know!"

A Sinking Feeling

Next Friday, when Vikki dived into the pool, Ricardo stood by the leaky faucet. Vikki swam,

then looked up at the computer clock. "Two minutes and five seconds!" Hank Bodd shouted. "A full minute off your best time!"

Vikki got out of the pool and stood beside Ricardo. "If you took two minutes, I'm Superman," Ricardo whispered. "Earlier today I marked the side of the bucket to show two minutes' worth of water. The water level went way past that mark."

The class left. Ricardo worked at cleaning the pool. But his eyes never left the computer clock. "Son, help me move the video equipment to our van," Hank Bodd said. "We'll be going now, Mike," he called to his assistant.

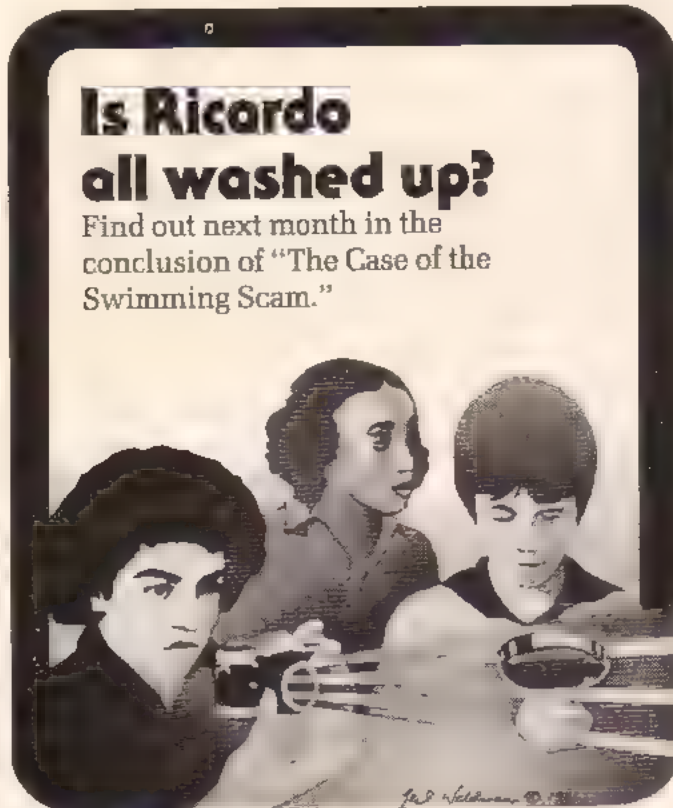
Ricardo helped with the job, then sneaked back to the pool. Mike was nowhere to be seen. But Ricardo saw a small computer keyboard attached to the clock. Beside it were some papers. He picked one up. "A computer program," he whispered.

Suddenly, someone grabbed him from behind. He flew through the air, splashing into the middle of the pool. He looked around desperately. His attacker had disappeared. Ricardo shouted in the empty room.

"Wait! Wait a minute! I can't swim!"

Is Ricardo all washed up?

Find out next month in the conclusion of "The Case of the Swimming Scam."



Maze Craze

Get a friend and a couple of pencils, and you'll be all set for this race.

1. Choose your starting positions. If you start in the circle, you must finish in the circle at the bottom of the maze. If you start in the square, end in the square.

2. Along the way the players' paths will cross. Make sure each of you ends up in the right place. The first player to land on FINISH is the winner.

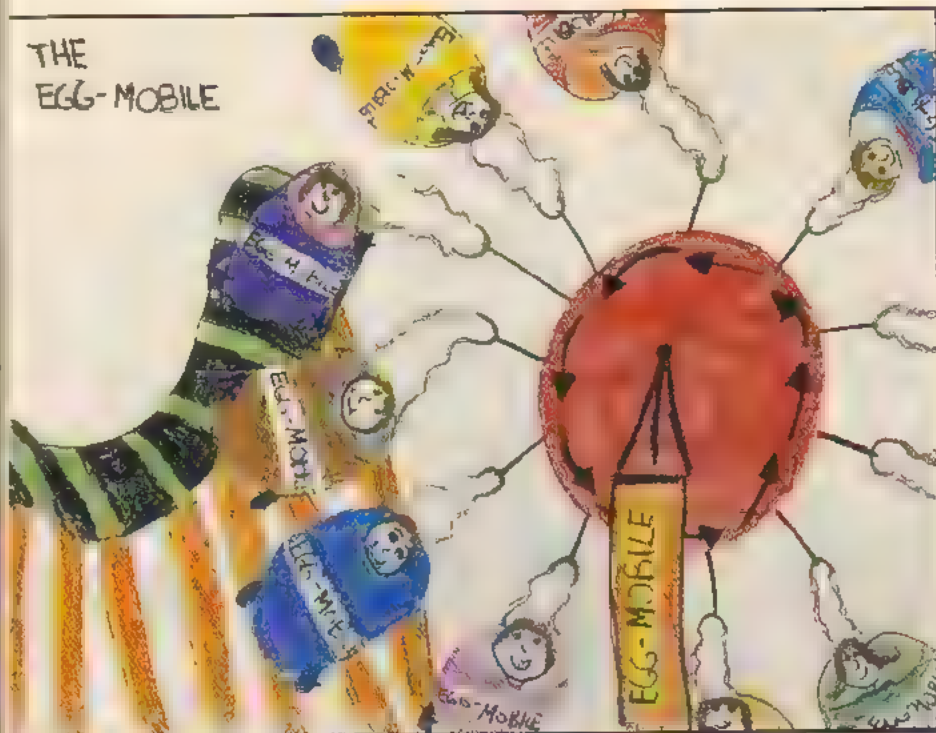
3. If you can't find a friend, have some double fun. Figure out the answers to both mazes yourself.



Answers on page 37.

MAIL

Contest Winners Last summer, in the July/August issue, we asked you to send us drawings of the most thrilling amusement park ride you could invent. Here are our favorites. Keep up the good work!



Amy Riesner, Lansdale, PA Spin around in the Egg-Mobile. Then your egg gets dropped onto a roller coaster.



Jennifer Dayan and Karen Johnson, Tampa, FL Take a fantastic voyage and see what goes on inside the human body.



Angela Kaminski, Lake Havasu, AZ Computers keep the Space Whirl from getting off course. It spins at 100 miles per hour.



Chris Neterer, Goshen, IN Just jump into the Toaster Roaster. Before you get too hot pop!—out you go.

Letters

The Story of Our Stories

Dear 3-2-1 CONTACT,

I really loved *Saving Babies* (June 1983). It was really neat when the nurse examined the baby through the portholes of the isolette. And I really liked the miniature horses. Well, what I was really curious about is how do you get the articles? Do you go all the way there to get it? Or do you just look it up somewhere?

Rachel Ramirez
Springfield, Illinois

Dear Rachel,

The answer to your question is: It depends. Sometimes we can write a story just by talking to people, and reading books and articles.

But in the case of a story like *Saving Babies*, a lot more goes on. To prepare that story about premature babies, we visited a hospital in New York City. There, we talked to the doctors, nurses and the babies' families. We were able to learn, firsthand, exactly how the babies were being helped.

Just One Complaint

Dear 3-2-1 CONTACT,

Your magazine is really great, but I've got a complaint. I am interested in astronomy and the planets but you've only printed one article on them. I am also interested in horses, but you've only printed one article on them. The last thing I'm interested in is unexplained phenomena and things such as astrology and UFOs. Would you print a few articles on things such as these?

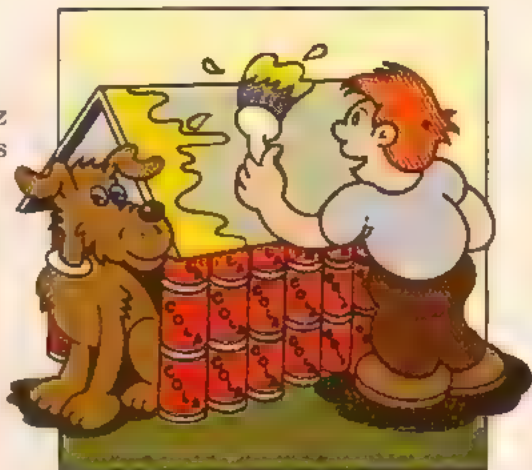
Amy Herstine
Genoa, New York

Dear Amy,

There are so many areas of science that we only have been

able to print a few stories on the topics you've mentioned.

But you're in luck this time. In next month's issue, you'll find a story about special equipment that astronauts will wear to explore and work in outer space. Also, coming in May, we'll be on the lookout for extra-terrestrials.



Save Your Trash

Dear 3-2-1 CONTACT,

For the last year or so I have been saving used paper. When I just need a scrap of paper I use that supply. My system reminds me of recycling paper. Maybe in a future issue you could write an article on recycling?

Melissa Booth
Washington, D.C.

Dear Melissa,

In the past, we have told our readers about a city that turned a mountain of trash into a park. We've also shown you a machine that gobbles up aluminum cans and recycles them.

Your idea to reuse old paper is just one way to recycle things at home. But there are lots of other things you can do with objects you usually throw away. For instance, clean out an old can and use it as a pencil holder.

Lots of good books have

recycling tips. One of the best we have found is called *Re/Uses*. It's by Carolyn Jabs and published by Crown Publishers, Inc.

For more tips right now, turn to page 35 in our Extra! department.

Picking the Winners

Dear 3-2-1 CONTACT,

I love entering 3-2-1 Contests so I think you should have more than one contest in an issue. Also, it shouldn't always be drawing a picture because some people can't draw very well. Thanks.

Claudia Schildkraut
Locust Valley, New York

Dear Claudia,

If you've been checking out some extra things to do in Extra! every month, you know that sometimes we run two contests in an issue. And if you've been keeping track of our contests, you know that they all haven't been for drawings. For instance, last month we asked you to send us poems about the heart.

When we do have a contest that calls for pictures, we don't just choose the prettiest ones. We try to pick drawings that have ideas no one else thought of. So, even if you don't think you're such a great artist, send us your contest entry anyway. You might be one of the lucky winners!

We Want Mail!

Dear Readers,

We really love hearing from you. The questions, ideas and complaints we get help us make CONTACT a better magazine. So why not drop us a line? We can't answer every single letter, but we do read them all. Send your mail to: 3-2-1 CONTACT: Letters

P.O. Box 599
Ridgefield, NJ 07657

Extra!

Hold on. You're not finished yet. We've got more puzzles, games, and things to do on the next few pages. So, for some Extra! fun, keep reading.

Park Scramble

Yellowstone National Park has its 108th birthday on March 1. Eleven other park names are hidden in this scramble. They go forward, backward, up, down, and diagonally. Try to find them—but only the names in CAPITAL letters.

Devil's TOWER	GREEN Mountain
GILA	Mount HOOD
GLACIER	SEQUOIA
Grand TETON	WIND Cave
Great SMOKEY Mountain	YOSEMITE
Great SWAMP	

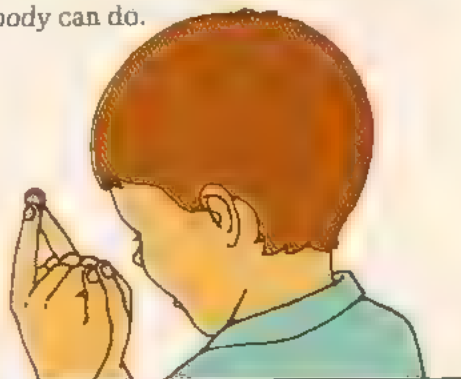
When you're through, the leftover letters will spell out one of March's special days.



E	F	R	I	D	O	O	H
R	T	E	N	S	T	D	A
S	A	I	O	U	Q	E	S
Y	W	C	M	O	F	T	M
S	P	A	A	E	O	E	O
R	I	L	M	W	S	T	K
N	I	G	E	P	G	O	E
G	G	R	E	E	N	N	Y

Body Bogglers

Are there limits to what athletes can do? We tried to answer that question on page 14. Now here's a little twist: Two tricks that are definitely beyond the limits of what anybody can do.



Penny Pincher

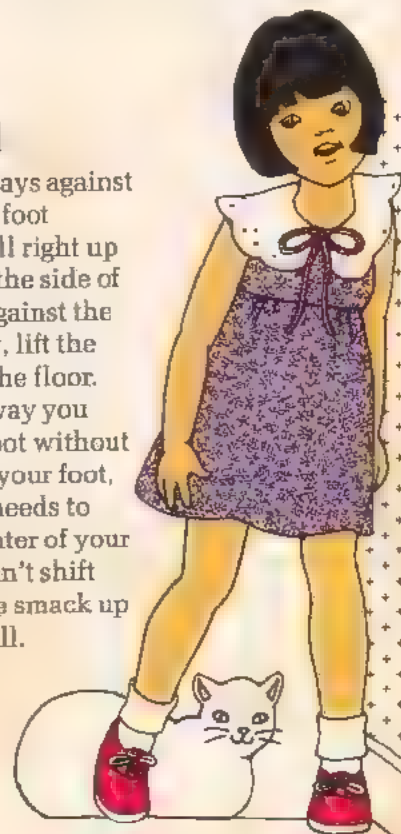
Place your hands together as in the picture. Now ask a friend to place a penny between your two ring fingers. Here's the challenge. Try to drop the penny by pulling these two fingers apart. No finger sliding allowed!

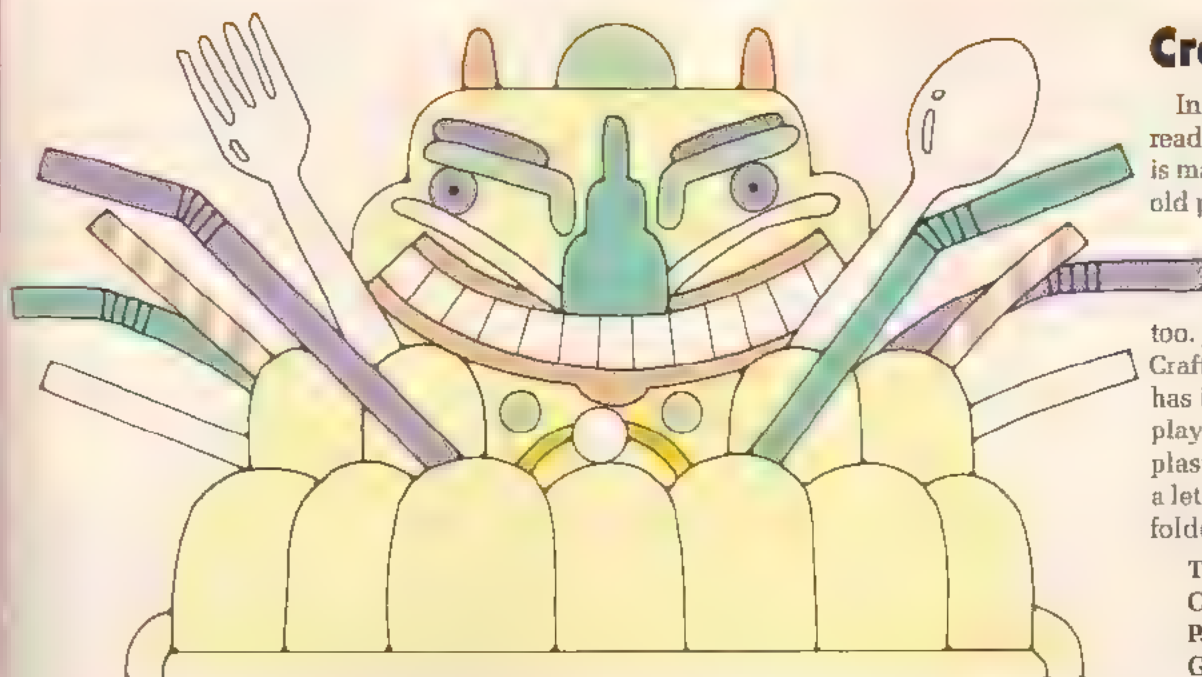
No matter how hard you try, it's impossible to lose the penny. The two fingers can't move because they're connected to the others by strings of tissue called ligaments. Unless the other fingers move apart, the penny stays pinched.

Up a Wall

Stand sideways against a wall. Put the foot nearest the wall right up against it. Put the side of your face up against the wall, too. Now, lift the other foot off the floor.

There's no way you can lift your foot without falling. To lift your foot, your balance needs to shift to the center of your body. But it can't shift because you're smack up against the wall.



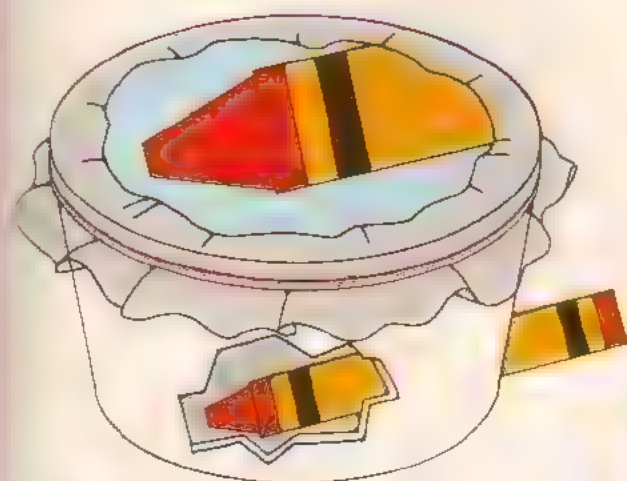


Crafty Critters

In *Any Questions?* you read about how plastic is made. Most of the time, old plastic ends up as junk.

But you can recycle plastic—and make some neat things, too. Just send for “The Crafty Critters Folder.” It has ideas on how to make play animals from old plastic containers. Send a letter asking for the folder to:

Texize
Consumer Relations
P.O. Box 368
Greenville, SC 29602



Waterscope

Make a water microscope. Get an empty plastic container. Be sure it's clean. Cut out two large holes near the bottom. Space them evenly. Put a piece of plastic wrap on top. Press it down in the middle so there's a well. Now put a rubber band on to hold the wrap. Pour water into the well on top. But don't let it overflow. You've got a simple microscope.

Put objects in through the holes. See how much bigger they seem. What would happen if you made a waterscope with a larger container?



Is there a special sport or game you play? Maybe it's one you made up. Or one a friend taught you. Tell us what the sport or game is and how it's played. You can even invent a new sport.

We'll pick our favorite sports. And those who sent them will get CONTACT T-shirts. Send your sport or game, with your name, address, and T-shirt size to:

3-2-1 Contest:
Sports and Games
P.O. Box 599
Ridgefield, NJ 07637

Extro!



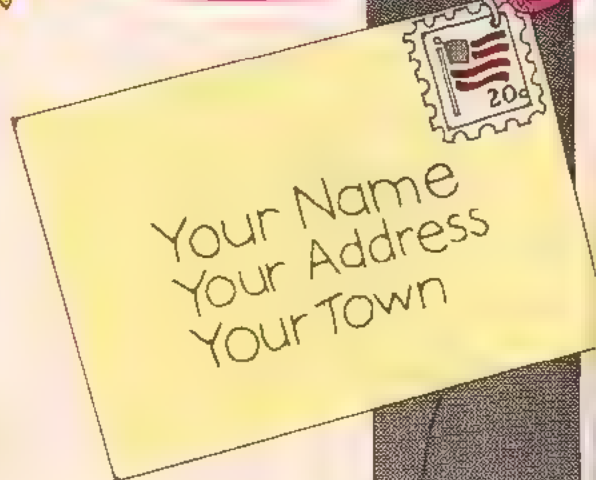
A Spring Pitch

Soon people will be getting their bats, balls, and gloves ready for another year of baseball. If you like to throw a baseball, here are a couple of pitches to try.

Fastball: Every pitcher throws one of these. And it doesn't only mean reaching back and throwing as hard as you can. There's a trick to it. When you're ready to let go, let the ball roll off your fingertips. Snap your wrist down at the same time. That makes the ball spin faster.

Change-Up: You don't need a curve ball to fool hitters. Try this sneaky pitch. It's thrown almost like a fastball. But it goes a lot slower. Put the ball back in the palm of your hand. Your hold on the ball should be loose. When you're ready to let go, don't snap down with your wrist. Then the ball won't get that extra spin. And it won't go as fast.

P.S. You don't have to wait until spring. These are great for pitching snowballs, too!



Up and Away

March winds are perfect for carrying objects high into the sky. And if you've ever wondered just how far those winds could take them, here's your chance to find out.

1. Blow up a balloon.
2. Tie a string around the end. Make sure the string is a few feet long.

3. Get a postcard. On one side, write your name and address. On the other write:
To the person who finds this:

I am doing an experiment. Please help me. Write on this card where you found it and when. Then put it in a mailbox. Thank you.

Be sure the card has a stamp!

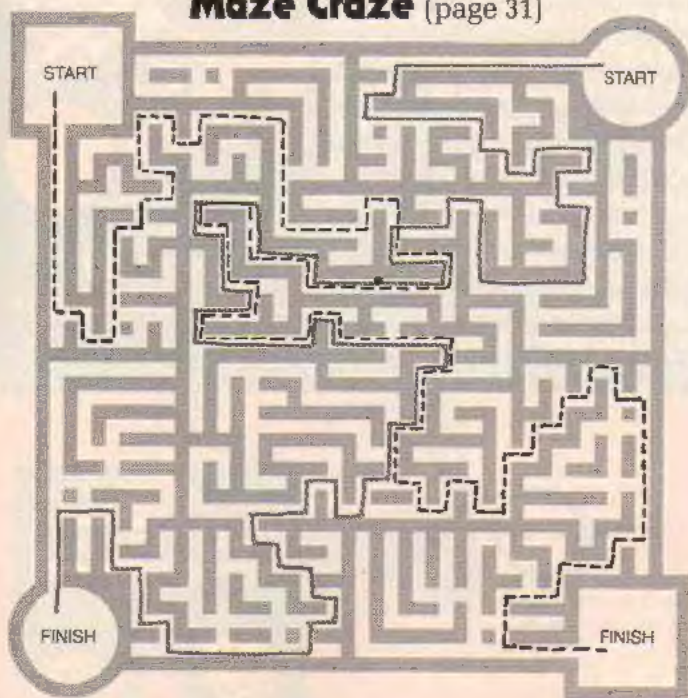
4. Punch a hole in the side of the card and tie it to the string, just below the balloon.
5. On the next windy day, take your balloon to an open place. Let it rise up in the wind. Then let it go.

Some of you will get the cards back. If you do, send us the card or a letter telling us what it said. Then, in a future issue of the magazine, we'll share what you have found.



Did It!

Maze Craze (page 31)



Thank You! Thanks to Mike Karukin, research coordinator at Neurological Associates, Miami Beach, FL, for information on headaches. Also, thanks to Steve Lee of SSK, Jim Darby of Mizuno, Greg Hind of Hind Wells, Inc., and Al Hagar and Larry Weber of Rawlings International for their help with the sports equipment story. Also, thanks to Phil DeHaas of the U.S Geological Survey for help with the information for the diagram in Earth Works.

Park Scramble (page 34)



FIRST DAY OF SPRING

Next Month!

Here's a sample of what you'll find in the next issue of 3-2-1 CONTACT:

Fooled You!

Some famous hoaxes! And tricks to celebrate April Fools Day.

Volcano Watch

Follow the action of these exploding mountains and read how they work.

Bloodhound Gang

Will Vikki, Skip and Ricardo solve their latest case? Find out.

Plus a Poster, a Game, Letters, and Much More!

FRONT COVER: PHOTO, FOCUS WEST/PETER READ MILLER; **P. 2:** PHOTO, PHOTO RESEARCHERS/WALTER S. CLARK; **Pp. 4-5:** PHOTOS, BILL LUSTER/SPORTS ILLUSTRATED; **P. 6:** PHOTOS, WIDE WORLD PHOTOS; **P. 7:** PHOTOS, BILL LUSTER/SPORTS ILLUSTRATED; **P. 8:** PHOTOS, HEINZ KLUETMEIER/SPORTS ILLUSTRATED; **P. 9:** (LEFT) PHOTO, FOCUS ON SPORTS/ANDREW D. BERNSTEIN (RIGHT) FOCUS WEST/BRUCE HAZELTON; **Pp. 10-11:** ILLUSTRATIONS/JOHN NEZ; **Pp. 12-13:** ILLUSTRATIONS/JIM DEIGAN; **P. 14:** (LEFT) PHOTO/WIDE WORLD PHOTOS, (RIGHT) PHOTO, FOCUS ON SPORTS/GEORGE TIEDEMANN; **P. 15:** (LEFT) PHOTO/WIDE WORLD PHOTOS, (RIGHT) PHOTO, FOCUS ON SPORTS/CHUCK MUHLSTOCK; **P. 16:** (LEFT) PHOTO/BETTMANN ARCHIVE, (RIGHT) PHOTO, FOCUS ON SPORTS/CHUCK MUHLSTOCK; **P. 17:** (LEFT) PHOTO/WIDE WORLD PHOTOS, (RIGHT) PHOTO, FOCUS ON SPORTS/HUBERT SCHRIEBL; **P. 18:** (TOP) PHOTO/PETER MENZEL, (BOTTOM) PHOTO COURTESY OF SAN DIEGO ZOOLOGICAL SOCIETY; **P. 19:** PHOTO BY RICHARD HOWARD, PEOPLE WEEKLY ©1993 TIME INC.; (BOTTOM) PHOTO/THOMAS EISNER & STEVE NOWICKI; **Pp. 20-21:** ILLUSTRATION/BRAD HAMANN; **Pp. 22-23:** ILLUSTRATIONS/PAT CUMMINGS; **Pp. 24-27:** ILLUSTRATION/BOB PEPPER; **P. 28:** ILLUSTRATION/BRAD HAMANN; **P. 30:** ILLUSTRATION/NEIL WALDMAN; **P. 32:** ILLUSTRATION/RICK SPAIN; **Pp. 34-36:** ILLUSTRATIONS/BARBARA HAMLIN; **BACK COVER:** PHOTO, FREDERIC LEWIS, INC./CHAROLD LAMBERT.

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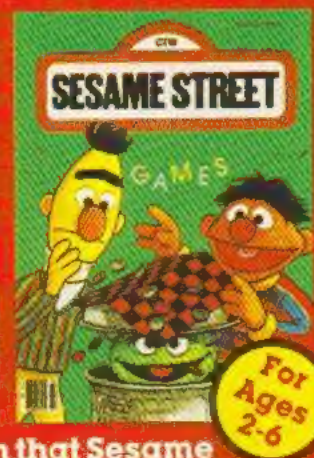
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Earthfacts: Mountains

Each month, CONTACT will bring you another *Earth Works*. Save these pages in a notebook. Soon you will have your own guide to the wonders of the planet earth.

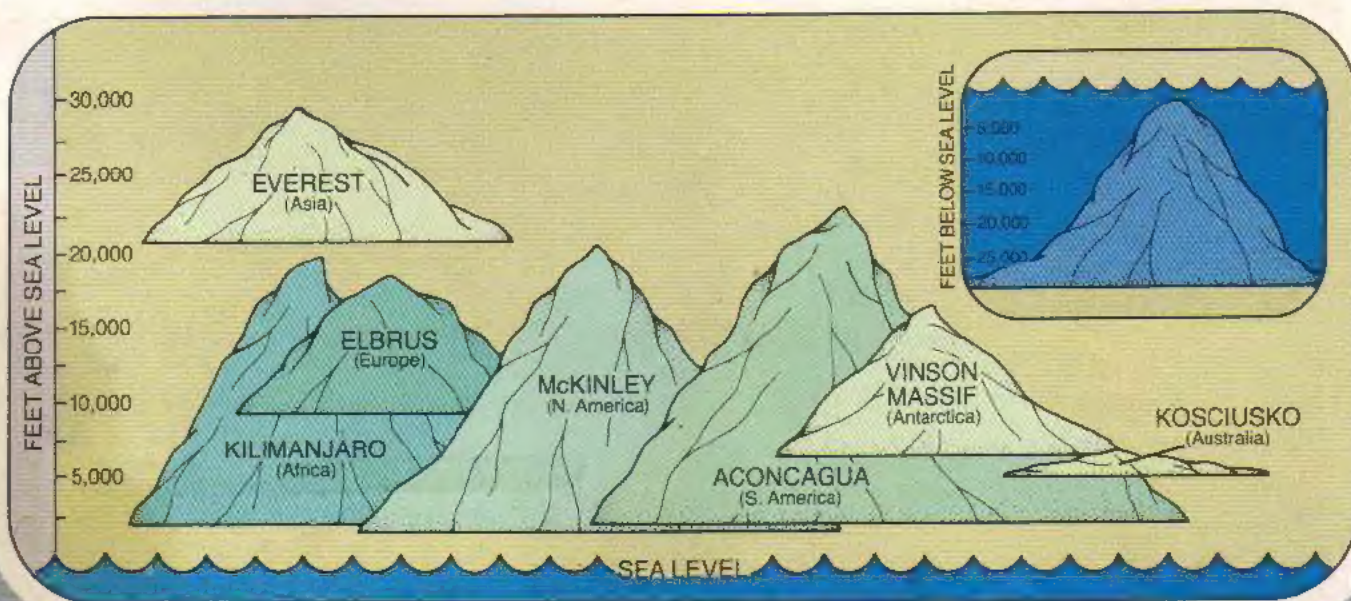
- You can't really tell a mountain unless you measure it. A true mountain must be at least 2,000 feet (610 m) high. If not, it's just a big hill.
- Asia's Mt. Everest is earth's highest mountain. But the biggest is Hawaii's Mauna Kea. From its base on the sea floor to its peak above the surface, it's 33,476 feet (10,203 m). That's over six miles (10 km) high!
- Mountains form because of the movement of molten rock deep in the earth. It pushes up against earth's surface. Parts of the surface get folded and crunched into mountains. When molten rock breaks through the surface a special kind of mountain, the volcano, forms.
- You can tell a mountain's age by looking. Young mountains, like the Rockies in the western U.S., are still growing. They have high, sharp peaks, steep slopes, narrow valleys, and canyons. Older mountains, like the Appalachians in the eastern U.S., have stopped growing. They are being worn away. They have low, rounded tops, gentle slopes, and wide valleys.
- The longest mountain chain on earth can hardly be seen. The chain stretches 25,000 miles (40,000 km) under the Atlantic, Indian,

EarthWorks

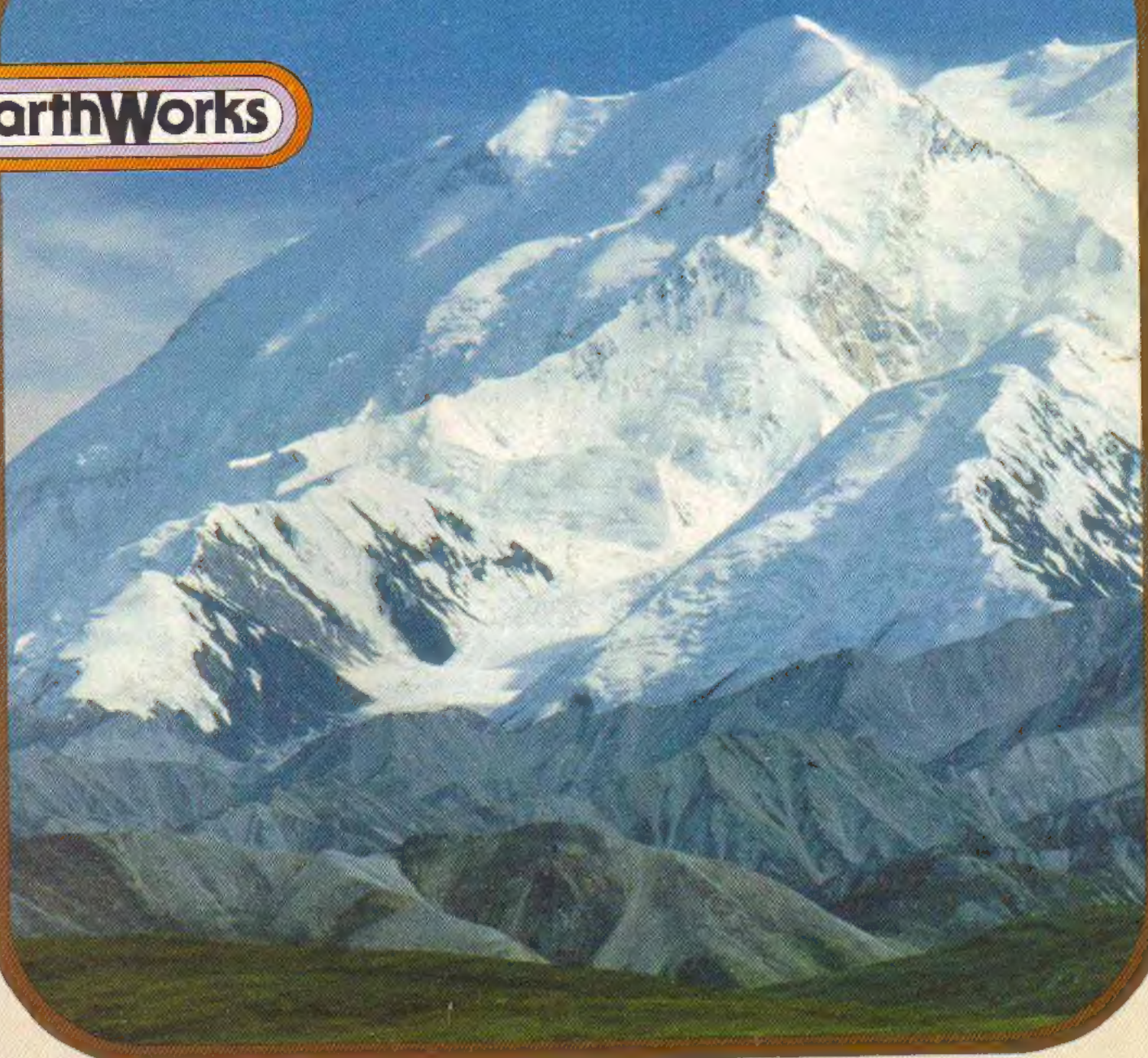
and Pacific oceans. A few of its highest peaks stick up as islands—like the Azores.

- For each 1,000 feet (333 m) you climb a mountain, the temperature drops 3°F (1.6°C). Air gets colder and winds blow harder. For protection from harsh weather, trees grow shorter. Nearest the top, there are only pines. Then trees disappear, leaving small plants. At the peaks of the highest mountains there are only ice and snow.
- Mountains can make it rain. Like you, air has to go up to get over a mountain. When air goes up it gets colder. All the water vapor in it changes into liquid water. It falls as rain. You can see this in states such as Oregon and Washington. The sides of mountains nearest the ocean are covered with rain forests. But after the air travels over the mountain, there is no moisture left. So the other side of the mountain is desert.

The diagram below shows each continent's highest mountain. Notice that the highest peaks don't always belong to the tallest mountains. For example, the base of Mt. Everest, earth's highest mountain, is on a highland 20,000 feet up. One of the earth's biggest mountains can't be seen at all. It's 1,200 feet below the sea.



EarthWorks



Mountains

You can find this twin-peaked mountain in Alaska. Its South Peak is 20,320 feet (6,194 m) above sea level, making it the highest peak in North America.

Nicknamed "top of the continent," this mountain was named after a president of the U.S. He never climbed it. But people who climb it can see for 100 miles (160 km) in every direction.

Has your curiosity peaked? Have you figured out the mountain's name? If you guessed Mt. McKinley—you're right. For more on mountains, turn to page 39.

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